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OCCASIONAL PAPERS

OF THE

BERNICE PAUAAHI BISHOP MUSEUM OF
POLYNESIAN ETHNOLOGY AND
NATURAL HISTORY.

VOL. I. — No. 2.

Director's Report for 1899.

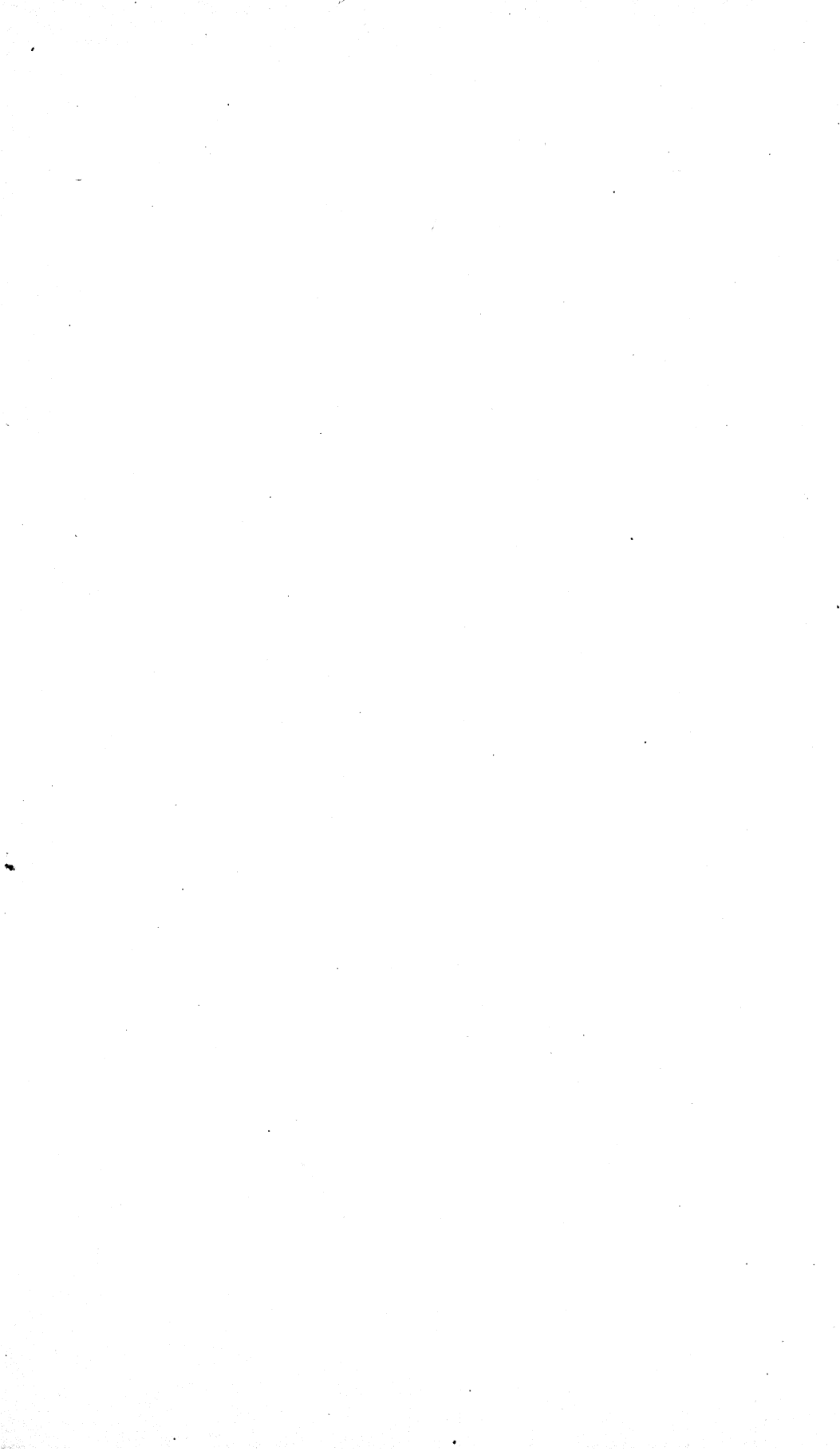
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To the Trustees of the Bernice Pauahi Bishop Museum.

Sirs:—I herewith submit my Report on the work and condition of the Museum for the year 1899 in accordance with the vote of the Trustees at the meeting of January 13, 1900.

WILLIAM T. BRIGHAM,

Director of the Museum.

Honolulu, January 30, 1900.

REPORT.

IN inaugurating a system of Annual Reports of a more formal character than has hitherto obtained during the few years since the opening of the Museum, it may not be out of place to state the nature and objects of this institution. In the Deed of Trust under which the Museum was established by Charles Reed Bishop the Trustees are directed to apply "*the net income (a) in and toward the maintenance, conduct and (to such extent as they shall in their absolute discretion think fit) further equipment and development of the said Bernice P. Bishop Museum as a scientific institution for collecting, preserving, storing and exhibiting specimens of Polynesian and kindred Antiquities, Ethnology and Natural History, and books treating of, and pictures illustrating the same, and for the examination, investigation, treatment and study of said specimens and the publication of pictures thereof, and of the results of such investigation and study, and (b) if the said Trustees or their successors in the trust, shall in their absolute discretion think fit, in the purchase or lease of suitable site or suitable sites for, and in the erection, furnishing, equipping and conducting also as a scientific institution, on the Island of Oahu, Republic of Hawaii, a Marine Aquarium and Biological Laboratory, but the trust in favor of the Bernice P. Bishop Museum shall always and in all things have precedence and be paramount over the trust in favor of the said Marine Aquarium and Biological Laboratory.*"

Working in these lines the Museum has "preserved, stored and exhibited" such specimens as have come to it by gift or purchase, and as will be seen by the lists of accessions during the past year many specimens have been added in this way, but in the first

work "collecting" in its true sense little has been done except in the Departments of Entomology, Ornithology and Radiata since the establishment of the Museum. It is true that the collections have grown, but it has been mainly by purchase, to a small extent by gift, and as yet no collectors have been sent to the other groups of this Pacific region. This omission it is hoped may be remedied in the near future. A beginning was made in 1896 by sending the Director around the world to examine the ethnological collections in the principal museums, and to study especially the objects from the Pacific Region, many of which can no longer be obtained in the place of their original use. If of no other material advantage to this Museum, the extensive although hasty journey showed plainly what had been done in other museums, and by inference what remained undone in the Bishop Museum. It strengthened the hope that one day, before the changes of civilization make it too late, the Natural History at least of the Pacific Region may be properly explored. In the Ethnology much has irrevocably passed away, much is passing, but it is not too late to gather material for comparison and study in many of the islands of this great ocean. In many of the groups of the south-eastern Pacific kapa making is still practised, tatuing is not a lost art, and at the other extreme geographically cannibalism is as rife as ever.

Although not feeling prepared to begin the work of collecting independently, the Trustees welcomed the opportunity offered by the Committee of the London Royal Society and the British Association for the Advancement of Science, and by furnishing one-third of the funds needed for the exploration of these Hawaiian Islands, became a third partner in this important undertaking. Mr. R. C. L. Perkins has for several years collected and studied the Hawaiian insect fauna for this Committee, and has incidentally collected a number of Hawaiian birds. The results of Mr. Perkins' explorations are now being published and distributed to the correspondents of this Museum. It is hoped that our future explora-

tions may be extended to other groups, but in such way that the collections may come to the Museum in their entirety instead of being shared with two other partners.

In furtherance of the plan for a Marine Zoological Station the Legislature set apart a tract of some twelve acres of land at the mouth of the harbor, at that time admirably adapted for the purposes of such a station and the only place suitable within many miles of Honolulu. Unfortunately an iron foundry and boiler shop has been erected on adjoining land, quite unfitting the place for study or any of the serious purposes of such an institution. The United States Government has since taken possession of the whole tract. In consequence the second branch of work indicated in the Deed of Trust has fallen into abeyance.

In turning to the record of this year's work I must pause to express the sorrow of the entire Museum Staff at the loss of the Reverend Charles M. Hyde, D.D., who as trustee has early and late taken a most lively interest in the work of the Museum. His help, advice and sympathy have always been with us and he was one of the earliest among our citizens to appreciate the advantages of a large public museum. His knowledge of Hawaiian character and customs was wide and deep. Much of this he has bequeathed to the Museum in his papers and annotated dictionary, but no material bequest can replace the constant interest with which he encouraged all workers at the Museum.

Buildings. Since the completion of Polynesian Hall, the first addition to the original Museum building, it has been felt that better accommodation should be provided for the Hawaiian portion of our collection, and through the generosity of Mr. Bishop at the end of the last year the contractors began the erection of a wing larger than the entire existing building. Work has continued on this during the year, and alterations consequent on this large addition have compelled the withdrawal of much of the Ha-

waiian Department from public view, and the disturbance incident to any large building operations has in various ways interfered with the regular work, and in the attendance of visitors which is less than in 1898. A large workroom with skylight has been built for photographic purposes as well as for the arrangement of large groups of Hawaiians cast from life by Allen Hutchinson, and for the construction of models of Kilauea and of an ancient heiau or temple. This is a most convenient addition to our workrooms. Cases have been placed in the basement of Polynesian Hall for the temporary storage of books. The Picture Gallery has been improved by the closure of unused windows and the removal of a wall-case thus giving more wall space. Four brackets for busts have been placed in the corners. To the pictures in this room have been added four of D. Howard Hitchcock's capital paintings of Kilauea and Mokuaweoweo, a number of Mr. H. W. Henshaw's platinotype photographs of Hawaiian scenes, and some good photographs of Maoris. During alterations a portion of the Hawaiian collection has been exhibited in table cases in the Picture Gallery.

The attendance is checked off each public day and an enumeration of nationalities made, and in a town of such mixed races this is both interesting and instructive. In giving the table below it should be stated (what the figures do not show) that many of the schools both public and private have availed themselves of the instruction the collections afford, and many hours have been spent in the Museum supplementary to the regular school exercises. By means of an abundance of plain printed labels information has been placed within the reach of all visitors except perhaps a few of the orientals. The hours have been from 10 to 5 during the summer months and from 10 to 4:30 during the winter, on Friday and Saturday; and also to accommodate passengers on the through steamers the Museum has been open on the days these steamers are in port.

TABLE OF ATTENDANCE.

1899.	Whites.	Hawaiians.	Portuguese.	Chinese.	Japanese.	Others.	Open Days.	Visitors on Closed Days.	Totals.
January	572	75	22	79	33	5	8	17	569
February	518	79	3	181	47	...	8	20	819
March	472	79	7	75	6	...	10	6	699
April	649	61	7	85	71	...	11	29	854
May	378	63	37	49	11	...	12	18	579
June	366	151	17	142	73	...	12	34	759
July	531	39	9	75	88	11	15	36	784
August	470	61	49	33	74	3	17	84	750
September	348	180	37	117	79	...	15	21	752
October	353	113	10	78	23	4	13	46	564
November	380	107	14	19	73	2	11	24	629
December	396	111	29	75	73	6	9	24	641
Totals	5224	1111	272	1060	691	41	141	350	8399

It has been customary to close the Museum on Public Holidays, but the Trustees voted shortly before the end of the year to keep the Museum open on all holidays except Thanksgiving and Christmas. On two holidays thus open a solitary visitor came in for a few minutes.

Classes from the Government Normal School have spent some time at the Museum making drawings of native implements. The attendance of visitors has been most satisfactory considering the distance from town, the bad road, and unsatisfactory tram car system.

At the beginning of the year the Director was without assistance in the Museum work owing to the resignation of the Curator Mr. Acland Wansey. February 15 Mr. John F. G. Stokes, who had been appointed Assistant some time before, arrived from the Colonies and at once took hold of his work with vigor and interest. During the year in addition to his duties as acting general Curator he has filled the post of Librarian. Mr. Allen M. Walcott had been appointed Assistant while as a member of the First Colorado regiment in service in Manila, and he arrived August 14 and he has since been busy in the general care of specimens. The Museum had long been without a Taxidermist and much material in this department had accumulated. The delay in filling the vacancy

was due to the difficulty of getting someone who was more than a mere "stuffer" of birds. Modern taxidermy demands an understanding mind as well as deft fingers, and a knowledge of and sympathy with Nature. The Museum has profited by the delay, for in the selection of Mr. Wm. Alanson Bryan of the University of Chicago (who arrived September 27) we have chosen a taxidermist fully able to meet all the needs of the Museum. Soon after his arrival, on the recommendation of Mr. Bishop, Mr. Alvin Seale was appointed collector of birds, a work in which he had already acquired an enviable reputation. He arrived November 8. It is expected that when the shore and sea birds of this group have been obtained, he will go to other groups and add to our collections. It is especially desired that the sea birds of the Pacific should muster in full force in our cases, and for this end an expedition to the Farallones of the Marianas and to the Chatham Islands would be most desirable. In the meantime Nihoa should be visited for the many species that breed there undisturbed.

In the spring the Trustees requested Dr. William H. Dall of the United States National Museum to visit the Museum and examine critically the collection of shells made by Andrew Garrett and increased by various purchases and exchanges. August 16 he arrived and for two months made a most careful study of the collection and his notes and corrections are in hand with a view to the rearrangement of the shells in the most approved modern manner, and also to the publication of the catalogue. His report to the Director is as follows:

BISHOP MUSEUM,

HONOLULU, SEPT. 1899.

DR. WM. T. BRIGHAM,

DIRECTOR BISHOP MUSEUM.

DEAR SIR:—I have the honor to make the following report on the Garrett collection of shells belonging to the Museum, its condition, the work which I have done upon it, and the work which still remains to be done.

I may say by way of preliminary that I had originally intended

to pass about three months at Honolulu, at work upon the collection, but, other engagements having left me only about two months for my visit to the Islands, this time was cut short. However, in the sequel this has proved not to be disadvantageous because, during the time at my disposal, I have done all that I could do here in the way of revision, and found that, to complete the work, I should require the greater facilities for access to literature and investigations not yet in print, which are afforded me in Washington. I have copied that portion of the catalogue which relates to the groups for which such reference is necessary, and will take this catalogue with me and make the revision upon it and, when completed, return it to you from Washington. By a rough calculation from averaging the entries on the pages of the type-written catalogue I find the collection contains between 8000 and 9000 species and about 25,000 specimens. Of these about one-fourth are pulmonate landshells. All are neatly mounted on card tablets with printed labels and very few are without complete identification and locality.

As might be expected from Mr. Garrett's residence and connections the collection is particularly rich in Pacific Ocean material and leaving out of consideration a few great national collections like those of London, Berlin, Washington and Geneva the Garrett is among the most complete if not actually the best supplied with the shells of the Pacific Islands. The series of landshells of the Solomon and Hervey groups is the finest I have seen anywhere, and those of the Society Islands are probably very complete.

In the marine shells the Cones and Pleurotomoids are especially rich and include many very rare forms. Scattered through the collection here and there, I have found a number of extremely rare forms which are common to only a very few fortunate museums. Several of these had been identified erroneously by Mr. Garrett or his correspondents, with more common species and the revision just made has corrected the error. A certain proportion of the species were wrongly named, which is not surprising when we consider that Garrett had no access to a large library or museum, and was obliged in great part to rely on the identifications made by more or less competent collectors with whom he exchanged specimens. A very valuable portion of the collection consists in the series of type specimens of the species described as

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Dr. Paul Fischer's *Manual de Conchyliologie*, Paris, F. Savy, 1888, for reference. Though like all manuals it is behind the times in some parts of its classification, yet it contains an enormous volume of facts and many illustrations. It is almost indispensable as a book of reference and costs only some thirty francs.

To supplement Tryon's *Manual*, which does not cover the bivalves or the fresh water and terrestrial peccinibranch gastropods, probably the best iconography is the new edition of Chemnitz' *Conchylien Cabinet*, edited by Dr. W. Kobelt.

As a work giving the latest information on the anatomical side the best is the new edition of Bronn's *Klassen und Ordnungen der Thierreichs, Molluska*, edited by Dr. H. Simroth. The possession of these three works will put the library in a position to meet any demands from students which are likely to be made on it for some years to come.

Very respectfully,

WM. H. DALL,

Palæontologist U. S. Geol. Survey; Cur. Dept. Mollusks,
U. S. Nat. Mus., Washington, D. C.

Dr. Dall, who at the conclusion of his visit met the Trustees and accepted the title of Honorary Curator of Mollusca, prepared a completely corrected list, in which all changes of name to suit modern views are noted, and the material so arranged that it will be possible to print the catalogue of what, in the opinion of Dr. Dall, is a remarkably good collection, especially in the shells of the Pacific Region. When these changes can be adopted and new labels printed we shall have nearly 10,000 species arranged in the most modern way. The duplicates are being arranged to facilitate exchanges, but the native Achatinellidæ, which are most in demand, we have not enough of for exchanges, nor can they be properly determined until Messrs. Sykes in London and Pilsbry in Philadelphia, who are now studying the family, shall have given us the result of their labors which will doubtless relegate many of the present species to the rank of varieties. The list of accessions in this Department will appear later on.

Publications. During the year the Trustees authorized the publication of the first part of the *Memoirs of the Museum* containing an illustrated account of Hawaiian Feather Work by the Director. The edition of this work was limited to 300 copies.

The exchanges established by means of our publications have already brought good returns: in no case has an exchange been declined, and it will be seen by the list of exchanges appended that many of the most important institutions pursuing the same lines as this Museum are there represented: some of their most valuable publications are already on our shelves.

During the year nearly 12,000 labels were printed for the Conchological Department and many hundred for other departments. Large general labels, notices, receipts, tables, letter heads, book plates, etc., have kept our printing office busy, and it has been a very necessary assistance to the work of the Museum. The outfit has proved sufficient, and well suited to our needs. The work of this office has called forth very gratifying approval from some of the best judges abroad.

Ethnological Department. Early in the year we received from a gentleman on the island of Malekula, New Hebrides, a collection of remarkable interest. The sacred tree drums of the New Hebrideans have long been known to ethnologists, but I have seen only one in any of the museums of Europe or America,—that in the Musée de Marine in the Louvre. We have now two fine specimens. What the wood is I am unable to say, but it is of remarkable hardness and high specific gravity. The labor of excavating the interior through the long longitudinal slit which is only two inches wide must have been excessive. The drums are placed in Polynesian Hall and one is shown in Fig. 1. The total height is 9 ft. 8 in.; circumference at base, 43 in.; length of slit, 47 in. The drum not figured is smaller, the dimensions being 8 ft. 3 in. high, 31 in. in circumference, slit 39 in. long, 2 in. wide. Photo-

graphs are in the Museum collection showing groups of these tree drums, and the manner of beating upon them by stones wrapped in kapa or other vegetable fibre. The sculpture of the head is broad and rude but evidently follows some canon as there is a strong family likeness. Idols are made in similar fashion but without the void within. Two large idols carved from tree ferns accompany these (Fig. 2). They are worshipped by the sacrifice of pigs, and in some of the photographs the porcine bones of the offerings mount to the chins of the figures. The face is decorated with color of a chalky nature broadly laid on. As the images stand the fern is inverted, the root mass serving for head. One image is 7 ft. 10 in., the other 7 ft. 4 in.

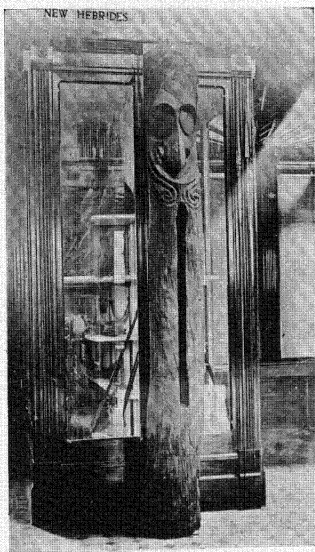


FIG. 1.

Four figures of a processional nature, made of bambu and twigs, with caricatures of human heads. Two of these (Fig. 3) have human crania with the facial region covered with some plastic material, and the nose is inordinately prolonged as if in protest against the niggardly allotment of Nature. The third has no human bone but cotton wool simulates it. The fourth is of a phallic



FIG. 2.

nature not unlike those used by the Japanese in certain festivals. These Malekulan images were, when exhibited in public, adorned with fern fronds and hibiscus flowers, the frames lasting for several occasions. With these came some very neatly woven mats used



FIG. 3.

for women's dresses, scant but sufficient. Very important were a complete skeleton of a Malekulan man and the skull of a woman. The former has been admirably mounted and will be a most interesting member of the collection it is hoped to have of all the diverse tribes and races in this region. The female skull shows a curious

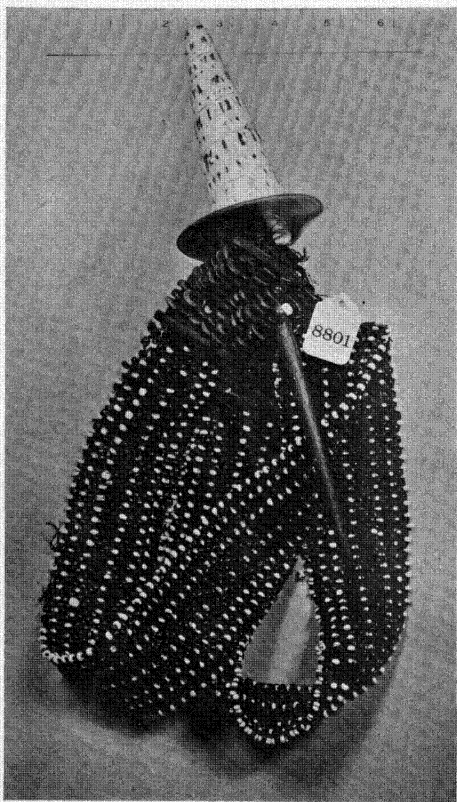


FIG. 4.

feature: we are assured that it is customary to extract the four upper incisors as an ante-nuptial precaution, and our skull is then that of a married woman. We have been promised a complete female skeleton.

From the Chatham Islands we were fortunate enough to procure a collection of implements made nearly forty years ago by an old resident. Since then an agent of an English museum has swept the group bare. Moriōri implements are very rare in col-

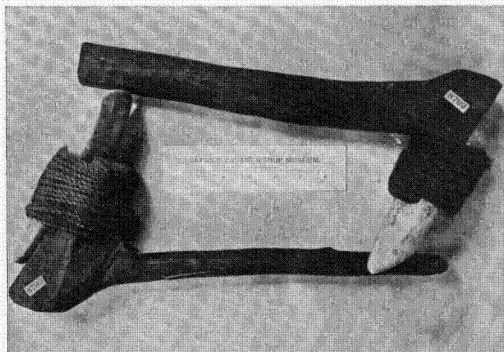


FIG. 5.

lections and the people are nearly extinct. In many of the specimens the Maori resemblances are plain, but the collection seems worthy of a more complete exposition and illustration than can be given in the limits of this report.

Usually we have been dependent on the "Morning Star" for Micronesian specimens, but this year we have obtained from another source several good things that were not in the Museum. A curious hairpin (Fig. 4) with a *Terebra* shell truncated and cemented with a resin to a polished *Meleagrina* shell for a top, and a band of beads of coconut shell and the red *Spondylus* so prized

in the Carolines. A good series of rasps (Fig. 10) and two shell adzes (Fig. 5) from the Gilbert Islands, and several good shell necklaces were also added. In the Hawaiian matters we have received by the kindness of Mr. C. C. Willoughby a cast of a most interesting

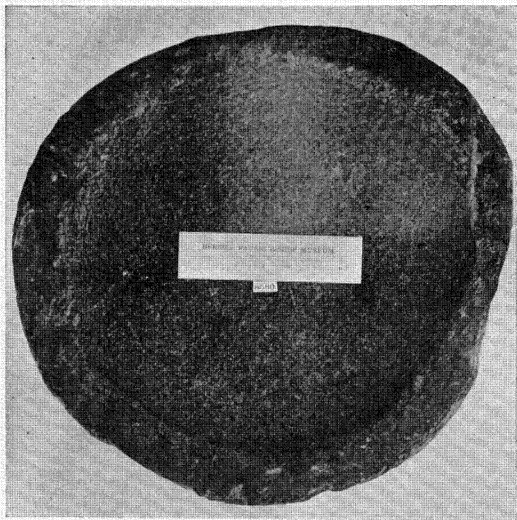


FIG. 6.

and peculiar stone poi-pounder which I saw in the Peabody Museum at Cambridge, Mass. A large flat stone dish (Fig. 6), once in a heiau on Molokai, is the largest worked stone dish of Hawaiian origin I have yet seen.

Natural History Department. From Mr. Koebele we obtained some fine bird skins, and from Ward's Establishment at

Rochester, New York, a large collection of palæozoic corals from the Niagara region. From the same source we have obtained an excellent series of mounted skeletons or vertebrates found in the Pacific region. Among the mounted mammals furnished by Ward's mention should be made of a fine Pacific walrus, a pair of fur seals and a sea lion. Other accessions will be noticed in the lists appended.

As a Bureau of Information. So far as has been possible the Museum staff have endeavored to answer questions as to matters within the province of their work. Hitherto most of this information has been sought by persons abroad, and of this two illustrations may be given. We have in the collection one of those most interesting stick charts (*Mede*) formerly used by the Marshall Islanders. These have become very rare as they have not been made or used for many years, and those in the museums of the world could be counted on the fingers of one hand. An officer of the Italian government sought some time ago for information concerning this, and lately a distinguished geographer of Hamburg has requested and obtained photographs and such information as was available. So far as I am aware our specimen is the best known, and we have also in necessary complement a model of the stick compass used with the *mede*. This compass has not been noticed by most of those who have studied the *mede*, and we owe it to Dr. Hyde's painstaking that this was obtained and its use learned from Marshall Islanders who had not forgotten the arts of their ancestors.

In the United States several machines have been invented for winding thread and cord in fancy patterns, and one form was found desirable because it was most stable and kept its form until nearly unwound. In litigation over the patent it was suggested that this was a method of winding well known to this region, and on appeal to this Museum photographs were sent which determined the matter. The peculiar wind is interesting and as it is wide

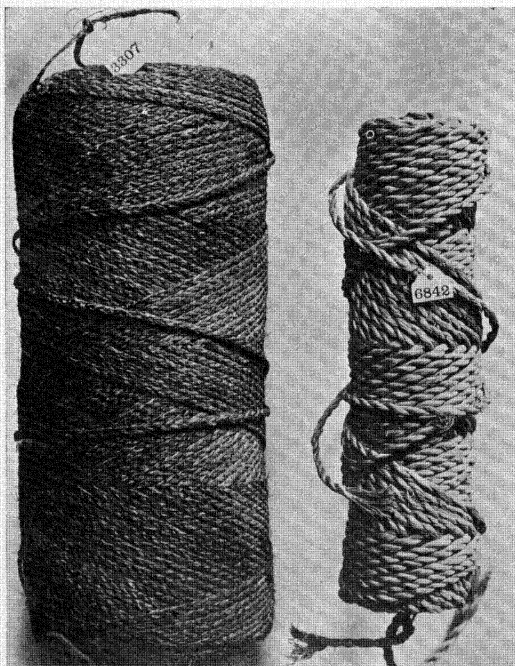


FIG. 7.

spread through Polynesia and Micronesia I give illustrations (Figs. 7 and 8) both of the coconut cord and of the imitation of the inventive American. Many can remember in the early days of the Micronesian mission Honolulu was well supplied with the trim rolls of coconut cord and sennit brought by the "Morning Star."

Much less success has attended the efforts of the Director to obtain for the information of visitors products of these islands. The collection of samples is growing slowly but not by the help of the producers who should be most interested. No plantation has ever sent a specimen of sugar, rice, tea, fibres or fruit. I have by purchase in the market or by the kindness of individuals collected a number of typical products which will be on exhibition when

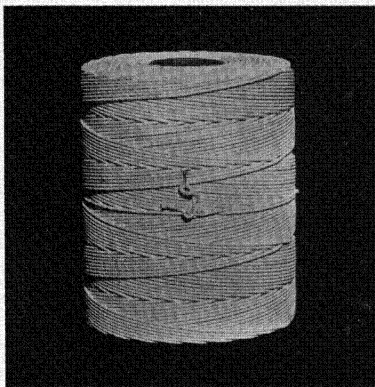


FIG. 8.

cases are provided for Hawaiian Hall, and it is hoped that then colored casts of the many tropical fruits raised in private gardens may be added to the exhibition. Moulds of a number of rare fruits have been made by the Director.

Exploration. In October, with Mr. J. F. G. Stokes, the Director at the instance of the Trustees visited Hawaii to measure and critically examine the heiau of Wahiula, a temple originally built by Paoa when he made land in Puna and twice rebuilt. It was the last to yield to the advance of Christianity, and as it is in

a remote and unfrequented place the remains are in comparatively good condition and have been used neither for goat pen nor cattle corral. The measurements and observations there obtained are now being embodied in a model of the restored ruins. A more detailed record of the survey will be reserved until an illustration of the restored heiau can be prepared.

From the extreme of Puna we next went to Kilauea where during ten days of perfect weather we photographed the walls of the crater from nearly fifty different positions on all sides of the circuit, and also made barometric observations to check levels. This material will be utilized later in preparing a relief model of Kilauea on a scale of $\frac{1}{1200}$. In eighteen previous visits extending over thirty-six years I have never seen the volcano so dormant: It shows signs of entering into a solfataric condition which would be most unfortunate for Hawaii. Many specimens of lava were collected and by the kindness of Mr. F. Waldron of the Volcano House some large and splendid specimens were added to our collection. Plants were not neglected and photographs of both Waoke and Mamaki, the two principal plants used in kapa-making, were secured. Specimens of these and other plants were added to the Herbarium. It was interesting to note how completely the Japanese raspberry has become naturalized along the roads nearly to the crater of Kilauea. It grows and bears in great luxuriance and although its large fruit is not of first quality it is pleasant to the taste and might, it would seem, be improved by judicious crossing. The extension of plantations to within a few miles of the volcano has destroyed the wild and beautiful scenery in great part, and where sugar-cane is driving out coffee the broad coarse features of the former are an unpleasant change from the fern and ohia of the old and narrow trail.

I have asked my assistants to notice for this Report some of the specimens that seem notable. Mr. Stokes has also prepared a complete list of the Corals, both palæozoic and recent, in our collection, and of the library accessions as well.

THE MAT SAILS OF THE PACIFIC.

By John F. G. Stokes, Assistant in the Museum.

OF the useful arts in the Pacific Ocean mat-making was, in former days, one of the most universally practiced, the materials used being the leaves of the *Pandanus odoratissimus*, Hibiscus and banana fibre, the fibre from the *Phormium tenax*, commonly known as the New Zealand flax, and the sedges *Cyperus laevigatus* and *Scirpus lacustris*. Of these the Pandanus was in greatest request, growing as it did most spontaneously throughout the tropics, and existing in barren parts where most other plants would die. Being an evergreen with abundant foliage the supply of material never ran short. When prepared the leaves were very soft and pliable, yet having sufficient stiffness to retain the strips in position when weaving. The Hibiscus (that mainly used being the *Paritium tiliaceum*) was also plentiful, but more work being required to prepare it and the mat woven therefrom not being equal to the Pandanus mat, less use of it was made. Only two or three species of banana were grown for their fibre and these were limited to the Caroline and Gilbert Islands, and while making a wonderfully fine mat—one that appeared quite as fine as our coarser linen—it was not as strong as Hibiscus or Pandanus and was manufactured mainly as an article of dress. The New Zealand flax was the best known fibre in that country, but its use was confined to New Zealand. As a durable article it has attracted the attention of European and American manufacturers. The sedges, *Cyperus laevigatus* and *Scirpus lacustris*, while no doubt growing elsewhere, were not used except on one of the Hawaiian Islands; and there, on account of the extreme softness of the material the mats were very largely manufactured for the clothing of the chiefly families; but on account of the natural conditions surrounding its growth it could never compete with the Pandanus in general usefulness.

It will thus be observed that of the plants known to the inhabitants of the Pacific Islands that most in demand, and which proved itself most suitable to the wants of the multitude for the purpose of making mats, was the Pandanus, and the mats made from it being so strong and pliable were always used (apart from New Zealand) to supply the sails of their canoes. When visiting Samoa, La Pérouse described a kind of linen, stating: "This is made of real thread obtained, no doubt, from some fibrous plants, like the nettle

or flax, and is manufactured without a shuttle, the threads being passed between each other as in making mats. This cloth, possessing the strength and pliability of ours, is well calculated for the sails of their canoes....." There can be little doubt that this material was made from the bark of the Hibiscus, which on being bleached and pounded by a process known to the Samoans, somewhat resembled coarse flax fibre. However, there has been nothing to prove that this cloth was ever used for sails, and La Pérouse is the only authority, ancient or modern, who suggested the possibility of its being so utilized. The Maoris, of New Zealand, used a sail of thick cloth or mat made in a frame from New Zealand flax. This was the only fibre known to them.

The mode of preparing the Pandanus leaves was similar in all the islands and the following description will suffice: The prickly edges were plucked off with a shell, and the leaves then rolled up and baked in a native oven. After baking they were strung together and placed in the sea to bleach for five to seven days, and then rinsed in fresh water and placed in the sun for drying and further bleaching. When thoroughly dry they were slit into thin strips with another shell, which made them ready for the weaver.

When not weaving mats for sails the custom was for the weaver to commence on the square base of the mat and after weaving a strip of the proposed breadth, to continue to weave forward until the required measurements were reached. This necessitated the spreading out of the entire work over a level space on the ground, and the weaver was obliged to move along as the mat grew. Of course these mats, made for sleeping or wearing, it was necessary to weave in one piece, but with the matting for sails the process was simplified for the weaver, the mats being woven in pieces of many shapes, which being of small size could be easier handled by the maker. The sails throughout Micronesia were always made in strips varying in width from four inches to three feet, the Micronesians being particularly apt in this form of mat-making. The Marshall Islanders, who are among the most expert canoe builders and sailors in the Pacific, use a lapboard cut from bread-fruit wood (*Artocarpus incisa*) on which the mat is woven. The board is arched and sets very comfortably in the lap of a person sitting on the ground. The strips of matting as woven are passed from the board and neatly rolled up. The accompanying illustration (Fig. 9) shows one of these boards and a sail strip, both being ex-

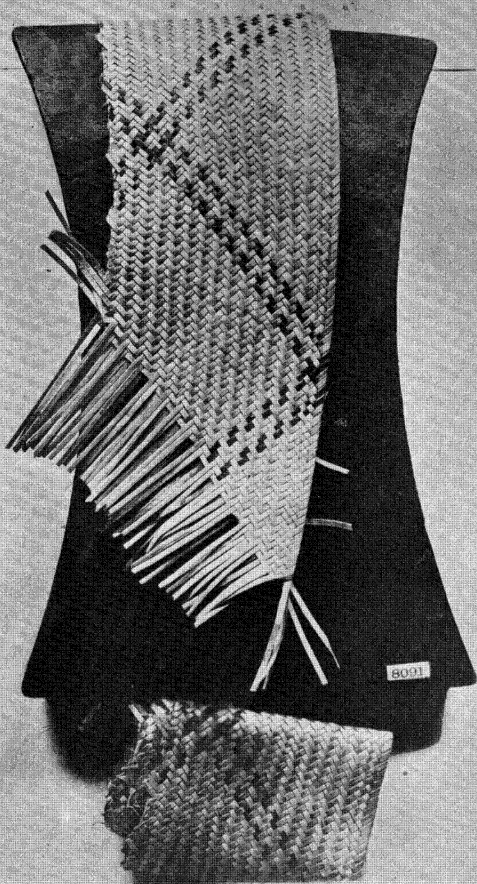


FIG. 9. BOARD FOR MAT WEAVING.



hibits in the Bishop Museum. The strip of mat has four dark strands of dyed Hibiscus fibre woven in on top of the usual strands of Pandanus; this is a favorite method of ornamentation among the Marshall Islanders. The weaving commenced on the left side, and the strands were cut to about twenty inches in length, being long enough to pass round the three strands of Pandanus used to form the border at the right and reach the left edge again, where after being woven in about half an inch they were trimmed off. It might be noticed that at regular intervals along the left-hand border some strands were allowed to protrude; at this edge, as stated, the fresh strands were applied, and when secured four ends out of every seven were trimmed off; the three remaining butts being left to guide the weaver in inserting the black ornamental strands. This strip is $4\frac{3}{4}$ inches wide, while the breadth of the strands varies from $\frac{3}{8}$ to $\frac{1}{8}$ inch.

Having woven a great length of sail the strips were placed together with edges overlapping and sewed with a thread made from coconut fibre or twisted Pandanus, the ends of the strips, on the edges of the sail being turned under and doubly sewed with the coconut fibre, which material is also used to bend the sail to the spars. A sail made in this fashion is very strong and will stand a great strain. It is about twice as heavy as an ordinary mat, and little heavier than canvas, and if wet becomes dangerous to use when suspended from the mast. The Micronesians in a rain storm prefer to lower the sail and roll it up in an envelope of Pandanus or banana leaves which they generally carry for that purpose.

The Hawaiian sail was made in strips, but that of Tahiti seems to have been composed of several large square mats sewn together, and could not have been a very strong combination. The New Zealand sails were made of strips of the "flax" matting or cloth and sewn together, and a handsome pattern of ornamentation frequently introduced, *i.e.*, that of the "bent knee." In all cases the work of weaving devolved on the women, while the men attended to the sewing and shaping of the sail.

The question may arise, "Why was it necessary to use mats of any kind for sails? Was there no other material?" The only other material within reach of the Pacific Islanders was the paper cloth beaten out from the bark of various trees and called Kapa in

the Hawaiian Islands, and Tapa or Siapo by other Polynesians. This cloth was not tough or durable, and could stand little wear even when dry, while were it wet the fibre would soon become disjoined and the kapa be dispersed.

Who taught these people the use of the sail and whence they procured their patterns is as much conjecture as is the origin of the Polynesian race at the present day, but it might be interesting here since it is generally conceded by competent authorities that the Polynesians emigrated from some part of Asia, to give short descriptions of the sails of the east coast of this continent, with those of the Islands, made principally long before the time when the influence of European civilization began to dominate the races which are considered inferior. The authorities here quoted are the voyages of the earliest European navigators, but great difficulty has been experienced in gleaning information concerning the sails from even these; for, while the canoes in nearly every instance took the fancy of the voyagers by their novelty, the sails were passed by with but a word.

The Chinese sail has retained its shape since the first visit of the Western civilizer, until very modern times, that seen today being practically the same which Anson saw on his visit: it was a large trapezoidal sail, the breadth being less than the length, made of mats woven from rattan (*Calamus rotang*) into long strips the length of the sail—stretched across the sail parallel to the top yard and deck were bambu poles about three feet apart; the reason for this being to strengthen the matting, and also no doubt to prevent the sail bagging and carrying dead wind. The sail of the Japanese was of a shape known as a square sail, attached to a large yard at the top of a tall mast, its length being perhaps half as long again as its breadth. This sail was composed of long narrow strips of cloth running the length of the sail and laced together. It was admirably suited for moving before the wind, but for tacking was useless. In Formosa and the Liu Kiu Islands the sails are after the fashion of the Chinese, but the Liu Kiu people have also been known to use sails of cloth. In the Philippine Islands, when at Manila, La Pérouse portrayed "A Parao or Passage Boat of Manila" having two sails almost identical with those of the Chinese, and being undoubtedly of Chinese origin. Throughout the Malayan Archipelago mat sails were used, there being one general

form for all—a rectangular or rhomboidal sail bent to a yard and a boom, and constructed of strips of mat fastened together. It had, with few exceptions, the breadth greater than the length, and was generally slung from the mast at a considerable height from the deck, with the after part of the sail raised above the fore part. This pattern was found to the eastward as far as New Guinea, but at various localities the rig was modified. At Amboina in place of one mast two were erected and bound together at the top, resembling closely sheers used for raising the mast out of a vessel. At Port Dorey and other settlements on Northern New Guinea three masts were fixed, in a straight line, with the upper ends fastened together. This sail was not seen east of New Guinea. Making another commencement on the south coast of New Guinea a sail entirely different was seen. The shape of this may be said to have resembled an attenuated arrow head with the haft removed and the tips of the thin barbs contracted. The sail was provided with a sprit and a boom of equal length, the sprit being about twice the height of the mast and having the lower end stepped in a chock on the deck near the foot of the mast. The sailing canoes were double and sometimes treble, and carried two or more sails. The shape of this sail held with little variation among the islands to the eastward almost as far as Fiji, and then became merged into the triangular sail of the Fijians. The people of New Hebrides had a sail shaped just as on the south of New Guinea, but the mast, stepped on top of a house built on the deck inclined forward to lie almost horizontal, and served more as a support for the sprit than an appliance from which to fly the sail. The New Caledonian sails were simply described as triangular. The sails of Fiji and Tonga resembled those just described as regards the spars, but the ends of the sprit and boom were wide apart and the sails extended flush with the extremes.

To the north and north-west of Fiji, among the Gilbert Islands, Micronesia and the Marianas, the sails were more of the latteen type than any others in the Pacific, but differed from the latteen in having, besides a sprit or yard, a boom of almost equal length. These sails were suspended from a mast which was set on a platform built on the beams of the outrigger and standing directly over the gunwale next the outrigger. Of course there were minor differences in the proportions peculiar to the many islands, but the

distinction was more marked in the rigging and build of the canoe than in the sail. These vessels sailed close to the wind, and were shaped bow and stern alike. When tacking the helm was put up instead of down, and the sail being shortened by rolling up partly the heel was lifted from the notch it had been set in and carried to the other end where it was again fixed—the sail being kept to leeward of the mast. For the purpose of shortening sail two ropes were passed through the masthead and fastened to the boom, one on each side of the sail. It might be well to mention that the outrigger was always kept to windward of the hull when sailing, for if to leeward the weight of the wind might easily force it under water and a capsize would promptly ensue. The mast in some places, the Caroline Islands notably, was inclined forward with the sail, and with each tack the stays were loosed and the mast moved, the masthead always leaning in the direction of the boat's course.

The Gilbert Islanders, besides the sail here described, which was used for the larger craft, possessed a small sail bent to a mast and a boom, the boom being fastened to hang at an angle of 50° to the mast. This sail was used on a small canoe for a single individual and was a simple sail for one man to work.

The Tongans had been noted sailors for many years, but they admitted having acquired their proficiency through the Fijians, whose methods and pattern they had adopted, and were considered by some to have surpassed their preceptors. The Fijians early made trading voyages to Tonga and Samoa, and while the Samoans were reputed to have built wonderful vessels in ancient times and to have led expeditions to far distant lands, our early explorers seemed to have little opinion of the Samoan vessels. Cook named Samoa the Navigator's Islands, not from what he saw, but from what the natives told him. Two kinds of sails have been found at Samoa; one was large and shaped like that of the Fijians, through whom no doubt the pattern originated, and the other was like that used on the Gilbert Island small canoe, and might properly be considered as the type of the older Samoan sail. There are old legends inferring that the Maoris of New Zealand set out from Samoa, and it should be here remarked that the sails described in "Cook's Third Voyage" and by d'Urville in the *Astrolabe*, and figured in the voyage of the *Coquille*, are of the same shape as the Samoan lastly described.

The sail of the Society Islander was in the shape of a half moon. A sprit or boom was fastened to the mast near the foot and curved upwards to a height a third more than that of the mast, which was vertical, the upper end of the sprit being directly over the mast-head. The sail thus being enclosed in a case, and practically a fixture when set, was awkward to work and when a squall came it was necessary to keep the head of the vessel to the wind, for which purpose several of the crew jumped into the water and swam at the bow. The only means of reefing was to unloose the sprit at foot and roll the sail around it. During squalls capsizees were not uncommon and the means employed to right the vessel were thus: After making everything fast the head of the sail was brought to windward, and a line being taken from it and passed over the outrigger (which was kept to leeward) several hands, by their weight on the outrigger and pulling at the line, lifted the sail out of the water some little way; then, the wind getting under the sail righted the canoe. Some men remained in the water to keep the head to the wind, and when bailed the canoe continued her voyage. Many of these canoes had two sails.

The Hawaiian sail was shaped somewhat like that of the Society Islands, but the top of the sprit was on a level with the masthead, near which it was held by a cord. The leech of the sail dropped gracefully between these two points, like that of Southern New Guinea. This sail, while no doubt having an artistic appearance, was not the most effective, and as early as 1823, the Rev. Wm. Ellis in his "Tour Through Hawaii" wrote: "The sails they now use are made of mats, cut in imitation of the sprit sails of foreign boats, which they say they find much better than the kind of sail they had when first visited by foreigners."

There are two other important groups of islands to be dealt with—the Marquesas Islands and the Paumotu Archipelago. The sail of the Marquesas Islands as seen by Cook in his second voyage and James Wilson in the *Duff*, 1796–8, was not of much value to its owner, as at best it was a clumsy contrivance built after the shape of the New Zealand sail but of indifferent materials, the mast, boom and matting showing great want of care. These people in Cook's time were not such expert sailors as the other Polynesians, though Alex. Dalrymple states in his "Voyages and Discoveries in the South Pacific Ocean," London, 1770, that when

Mendaña visited the group (1595) they had much better canoes and sails than two hundred years later.

As regards the Paumotu Archipelago—these islands were little visited in former times on account of the difficulty of the navigation. The gentlemen of the Wilkes exploring expedition were the first to describe these parts, and there was no information given concerning the sails. The Paumotuans had large double canoes which traded between the innumerable small islands, and from a model of a canoe in the Bishop Museum from Manihi Island it was ascertained that the sails were similar to those of the Caroline Islands. The canoe model was made within the last twenty years, and there is little to show that the style of sail was not of modern introduction. There are two sails on the model, suspended from two vertical masts.

RAY-SKIN RASPS.

By Allen M. Walcott, Assistant in the Museum.

AMONG the specimens in the Gilbert Islands section of Polynesian Hall are the four rasps shown in Fig. 10. These implements are more or less common throughout the islands of the Pacific. The outside or rasping portion is the skin from the back of a species of *Trygon* or sting-ray not uncommon in the waters about the islands. Any convenient piece of wood makes the handle and core, No. 3 having for a center a portion of the leg of a foreign chair. As this skin when dry cannot be bent readily it is, while wet and pliable, sewed firmly around the wood with coconut fibre thread. It will be seen from the illustration that the tubercles on the different rasps vary much in size, and this is due to the age of the fish from which the skin is taken.

The various grades were adapted to the work to be done. Almost their sole use was to enable the Gilbert Islanders to so shape the edges of the boards of their canoes that when sewed together they were water-tight. As the Gilbert Islands are low coral atolls the trees are generally not large enough to be used for dug-out canoes; hence the necessity for using planks. These were obtained from the breadfruit tree (*Artocarpus incisa*). For the making of the great proas, with a length of seventy feet and a

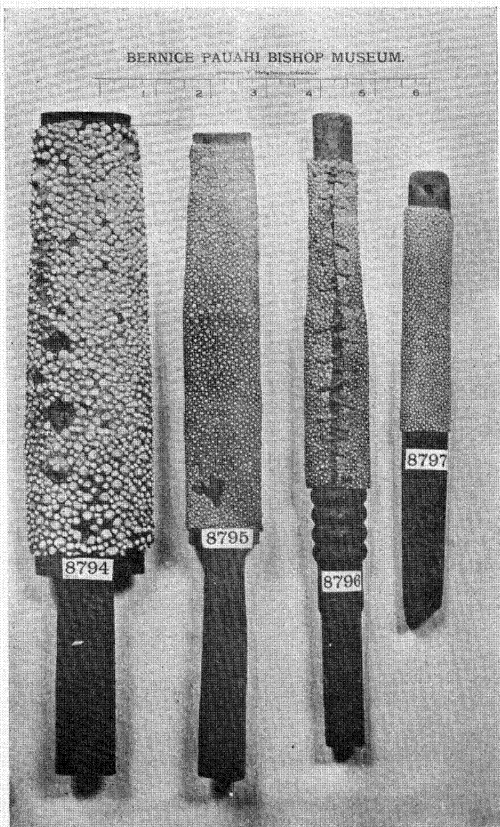


FIG. 10. RAY-SKIN RASPS.

depth of seven or eight, the number of pieces and the work were considerable. During the building each board, before it was permanently fastened, was placed upon its lower neighbor edge to edge, between the two being a strip of pandanus leaf well covered with charcoal. In this manner the points needing to be reduced were blackened as a guide to the rasp. Such fine work was not suitable for the shell adzes of the islanders.

For many years the natives have generally used steel rasps, when obtainable, in place of their less durable ones of ray-skin. The effectiveness of the latter while it is new is quite as great as of those brought by the white man. However, the tubercles ordinarily could be used but a week at most, being often rendered useless by but one day's hard work. The native name is Tapāugu. In other island groups there were also in use, for reducing purposes, shark-skin rasps, pumice and mushroom coral (*Fungia*), some employing all methods while others knew of but one or two.

FIELD NOTES ON THE BIRDS OF OAHU, H. I.

By Alvin Scale, Collector for the Museum. November 12, 1899 to March 20, 1900.

OWING to the bubonic plague quarantine these observations, since January 3, have been restricted to the immediate vicinity of Honolulu. The difficulty of collecting in these islands, with their dense tropical jungles and knife-like mountain ridges, has been mentioned by all former collectors, and I can only add, that while I have collected in difficult places before, including the boggy tundra of Siberia, the high mountains of Alaska, the Tamerack swamps of Michigan, and the Everglades of Florida, I have found nothing that could discourage an Ornithologist so much as one of these islands. The different species of land birds found on Oahu are few in number. Mr. Wilson, in "*Aves Hawaiienses*," gives but five existing forms, as follows:

ORDER PASSERES.

Vestiaria coccinea.

Himatione sanguinea.

ORDER PASSERES.

Chasiempis gayi.

FAMILY *Drepanidæ*.

Oreomyza maculata.

Chlorodrepanis chloris.

FAMILY *Muscicapidæ*.

ORDER LONGIPENNES.

FAMILY **Laridæ.**75. ***Sterna fuliginosa***, Gmel. Ewaewa.

Sooty Tern.

Off the east coast of Oahu two large volcanic rocks, covering perhaps 300 square feet, arise abruptly from the water to the height of 200 feet; these rocks are about a half-mile distant from the shore, directly off Mokapu point. Owing to the coral reef, Heeia, six miles distant, is the nearest accessible point by boat. These rocks are called Moku Manu (Bird Island). I resolved at once to visit them. On January 3, taking two expert native boatmen from Heeia, I started down the coast. Long before the rocks were reached I could see multitudes of birds hovering in the air above the rocks and looking exactly like a swarm of bees. When about a quarter of a mile away I began to hear the noise and gabble. As we got nearer the big Frigate Bird (*F. aquila*) could be seen sailing about and soaring up to wonderful heights, surrounding these birds like clouds, but not arising to such great heights, were Sooty Terns (*Sterna fuliginosa*), which by thousands were the most abundant bird on the rocks. Flying among these birds were many Noddy (*Anous stolidus*), very conspicuous by their dark color.

One big Albatross (probably *Diomedea chinensis*) took flight as we were quite near the rocks; unfortunately our shot (No. 8) proved too small and the distance a little too great, as this very desirable bird merely shook his feathers to rid them of the shot and swept serenely past us, turning his head to give the boat a very sagacious look as he took his leave. Sooty Terns by the thousands were sitting about all over the rocks and flying around our boat in swarms, so near one could hit them with an oar. The din raised by their cry and the noise of their wings was so great one had to shout at the top of the voice to be heard two or three feet distant. The rocks were honey-combed with burrows and must be an ideal nesting place. I looked in vain for a landing; owing to the direction of the waves there seemed to be no lee shore; on the south side one could land on a calm day, but the sea was too high, and so the attempt to land was given up, to my great disappointment.

A good series of Sooty Terns and Noddy was obtained. One of the specimens, a male *Sterna fuliginosa*, was in full breeding plumage, the delicate bluish flush covering the entire under sur-

face excepting the neck, which with the forehead is pure white; top of head and lores, jet black; wings, mandible, top of neck, all sooty black. This specimen's measurements* were as follows: Length, 18.25; wing, 11.87; tail, 5.19; the two outer feathers, 8.25; culmen, 1.81; its depth at nostril, .37; tarsus, .93; mid-toe and claw, 1.19. Palmer found this tern nesting on Laysan and French Frigates Shoals.

79. **Anous stolidus**, Linn. Noddy.

All the birds of this species shot at Moku Manu on January 4 were in dull winter plumage of uniform sooty brown; top of head hoary gray merging gradually into sooty brown on the hind neck; lores, bill, feet, wings and tail black. The reproductive organs were very minute, in strong contrast to the organs of the Sooty Terns taken on the same day. Length, 17.5; wing, 10.5; tail, 6.19; culmen, 1.64; its depth at nostrils, .37; mid-toe and claw, 1.60.

One specimen, an immature male taken at Moku Manu January 4, gives the following measurements: Length, 17.5; wing, 11.6; tail, 5.63; tarsus, 1; culmen, 1.39; its depth at nostrils, .43; mid-toe and claw, 1.46. This specimen, while exceeding the largest measurements of the adult shows unmistakable signs of immaturity in the dark line along the upper wing-coverts, a general lighter color to the plumage and a soft bill. This specimen has the gray coloring of the head confined to the forehead; superciliary stripe almost pure white; lores, black; abdomen with a decided grayish cast; faint fleckings of gray appear on the under wing-coverts; bill, black, shorter and stouter than in mature birds, with a prominent keel; wings, black; feet and tarsus a blackish brown. The mantle has less plumbous, and the wing-coverts are much lighter than in the mature bird.

Anous hawaiiensis, Rothsch. Noio.

Hawaiian Tern.

December 23, while shooting near a shallow pond on the east coast of the island, four of these graceful terns came flying past and I secured three. These have the upper part of the head, top and sides of neck, lavender gray, much lighter on the head and merging into sooty black on the upper mantle. Lores, throat,

*The measurements in the following paper are all in inches, and together with the color markings were taken from specimens in the flesh.

under neck, under surface of body, mantle and wings, sooty black; feet and tarsus yellowish brown; webbs, yellow; iris, dark brown.

The "light ashy green" on the hind neck and upper part of the interscapular region, which Mr. Rothschild speaks of in "Avifauna of Laysan," is presumably characteristic of summer plumage, as these winter specimens fail to show such coloring.

Length, 13; wing, 9; tarsus, .88; its depth at nostrils, .25; culmen, 1.53; mid-toe and claw, 1.34.

ORDER STEGANOPODES.

FAMILY **Phaethontidæ.**

113. **Phaethon lepturus**, Lacép. & Daud. Haakoae.

Red-billed Tropic Bird.

Three times I have observed these birds sailing about the ridges of Waiolani mountain above Honolulu, at about 1000 feet elevation. Few birds can excel the grace and ease of this bird's flight among the cliffs of the mountains. This species occurs on all the islands.

ORDER ANSERES.

FAMILY **Anatidæ.**

143. **Dafila acuta**, Linn. Pintail.

December 23, I accepted the courteous invitation of the Honolulu Gun Club to accompany them on a shoot over their preserves in the vicinity of Waimanalo. Decoys were spread in the early dawn and twenty ducks were secured. I am told this was an unusually small bag for the club, being but three ducks to the man. A large number of plover were taken, however, to make up the deficiency. Sixteen of these ducks were of the above species. The remaining four were the native Hawaiian duck.

Anas wyvilliana, Selater.

This duck is fairly common on the island among the tule swamps and ponds near the coast. Length, 18.50; wing, 9.67; tail, 2.37; tarsus, 1.46; culmen, 2.12; its depth at nostrils, .61; mid-toe and claw, 1.81.

ORDER HERODIONES.

FAMILY **Ardeidæ.**

Nycticorax griseus, Wigg. Auku.

Black-crowned Night Heron.

These are common about the marshes in the vicinity of Kahuku. During the day they usually hide in dense clumps of trees

near the coast or up the narrow cañons. One was taken at Kahuku December 31, and two were shot in the vicinity of Waimanalo December 23. Length, 25; wing, 12.57; bill, 3.19; tarsus, 3; mid-toe and claw, 3.57. This bird is found on all the islands.

ORDER PALUDICOLÆ.

FAMILY **Rallidæ.**

Gallinula sandvicensis, Street. Alae.

Mud Hen.

These birds are common in the tule swamps, kalo patches and fish ponds all over the island. The specimens taken show a decidedly red tarsus.

ORDER LIMICOLÆ.

FAMILY **Scolopacidæ.**

248. **Calidris arenaria**, Linn. Hunakai.

Sanderling.

The Sanderling is by no means an uncommon bird here during the winter months. On December 21 six were observed during one afternoon along the sandy northern shore of the island, in the vicinity of Kahuku. It is interesting to watch these little birds following the retreating wave down the sandy beach, and their active scramble for the freshly uncovered Crustacea. I have frequently seen them running along the beach with the end of the bill held firmly in the sand, literally plowing out their food. The specimens taken were all in very light winter plumage. No doubt this bird occurs on all the islands of the group, although it has only been reported from Kauai and Niihau.

259. **Heteractitis incanus**, Stejn. Ulili.

Wandering Tattler.

This bird could teach an "Ancient Mariner" many things of the sea. Its knowledge and judgment of the waves is nothing short of wonderful. They know perfectly well the rhythm of the sea, and just how many big heavy waves will come pounding over their rocks before there is a lull; this they show by running far down on the rocks after the third wave, knowing that the fourth will be smaller and not large enough to knock them from their new feeding ground. They also know perfectly well if the incoming wave is going to break or merely swell past them, their judgment in this matter being better than my own, although I

have spent much time by the sea. When heavy seas were running I have been perfectly astonished at the rapidity with which they followed up the retreating waves, gathering up the dainty bits of food cast up, and judging with perfect accuracy how far they could follow down the rocks in safety before the next wave came on. They are a wary bird and difficult to approach. One has to advance when they are busy feeding, and "freeze"—*i. e.*, be perfectly motionless—when they are looking until they fancy one is a rock, their power to discriminate their enemies being less than that of the native land birds. When alarmed they fly up with a cry like U-l-ŷ-l-ŷ, uttered in a voice clear as a bell.

During the winter months these birds can usually be found singly or in pairs along any rocky portion of this coast, being about as common here as they are on the west coast of the United States or Alaska. Three specimens were taken in the vicinity of Waimanalo December 23, and one at Heeia January 3. These were all in winter plumage and showed no signs of the barred breast markings. The nasal groove was two-thirds as long as the culmen. Length, 12; wing, 7.56; tail, 2.87; tarsus, 1.50; mid-toe and claw, 1.33; culmen, 1.63; nasal groove, 1.10.

ORDER LIMICOLÆ.

FAMILY Charadriidæ.

272a. **Charadrius fulvus**, Gmel. Kolea.

Pacific Golden Plover.

During the past four months, November–March, the Pacific Golden Plover has been very abundant, especially in the rocky pastures, along the seashore, and in the inland valleys, to an elevation of 200 feet. On December 21 a walk of three miles, in the vicinity of Kahuku, resulted in seeing 205 of these birds by actual count; they were scattered about singly or in groups of three or four. These birds have a clear whistled note which changes to an entirely different and rapid alarm cry as they take to their wings. I have frequently decoyed them by throwing my hat in the air. About nightfall the plovers come in bands to feed by the shallow ponds and sloughs near the shore, a habit that results in the destruction of hundreds of birds by Still Hunters.

December 21 eleven specimens were shot along the northern shore of the island in the vicinity of Kahuku. Nine of these were males in characteristic winter plumage, showing no black on the

ventral surface; the slight dark streakings on the neck merge into indistinct light brownish mottlings on the breast. It is remarkable, in contrast to this, how bright the plumage on the dorsal surface remains during the entire year. The average measurement of the nine male specimens was as follows: Length, 9.98; bill, .91; wing, 6.48; tail, 2.34; tarsus, 1.72; mid-toe and claw, 1.25; culmen, .85. The plover is found on all the islands during the winter months. I am told it leaves the islands about May 1, and returns sometime in August.

ORDER LIMICOLÆ.

FAMILY **Aphrízidæ.**

283. ***Arenaria interpres***, Linn. Akeke.

Turnstone.

In regard to the Turnstone, I have the following entry in my notebook: "Nov. 22.—Two *Arenaria interpres* were shot near a small pond in the vicinity of Kahuku; these were males in winter plumage." "December 21.—Turnstones are common in the rocky pastures near the northern shore of the island. They are usually seen in small flocks of three or four, frequently consorting with the Golden Plover (*C. fulvus*)."

These birds are quite wary and usually fly before one is within range. Twenty of these birds were counted during one hour spent in the field. All the specimens taken on this island fall short on the wing measurements. Of six specimens the longest wing was 5.61, while the average was 5.50. Length, 9; wing, 5.50; tail, 2.31; tarsus, 1; culmen, .86; mid-toe and claw, 1.19. Found on all the islands.

ORDER RAPTORES.

FAMILY **Bubonidæ.**

367. ***Asio accipitrinus***, Pall. Pueo.

Short-eared Owl.

In the vicinity of Honolulu this owl is quite abundant. My first specimen was shot November 23 at an elevation of 1000 feet. This was a male in characteristic plumage, with a very dusky frontal patch. Another specimen was taken in Kalihi valley, elevation of 200 feet. This was an adult male in the most beautiful plumage; the upper surface is much lighter than in the November specimen; the under tail-coverts are pure white merging into a very pale buffy white on upper abdomen;

dusky frontal patch conspicuous. Another, a female in very dark plumage, was taken March 15. The ovary of this bird contained twenty-one small eggs, ranging from the size of No. 6 shot up to the size of a large pea.

These owls come out about sunset and fly around near the ground, uttering every little while their cry of P-we-o from which they get their native name. I have frequently watched three or four hawking about in Kalihi valley at sunset; they sail quietly along, just skimming the tops of the low guava bushes and grass, alighting occasionally to pick up a stray insect. The stomachs of the three taken, however, were entirely destitute of food, perhaps owing to their being taken early in the evening. I have decoyed these birds within range by sailing my hat in the air. The Pueo is found on all the islands. Length, 14; wing, 12.5; tail, 5.75; tarsus, 1.62; culmen, .68; its depth at nostril, .62; mid-toe and claw, 2.

Chasiempis gayi, Wilson. Elepaio.

Oahu Fly-catcher.

This is the most common native land bird to be found on the island. One will usually see at least three or four during a day's hunt in the mountains. On March 14, a particularly favorable day, I observed eighteen by actual count. This Fly-catcher, unlike all the other birds of the island, does not regard man as its greatest enemy; a condition resulting, no doubt, from years of worship by the natives, for this bird was the god of the canoemen and gave judgment on all the timber used in boat-building. Its usual haunt is the densely wooded cañons at an elevation of from 800 to 1300 feet. It is a most active and interesting little bird and can easily be called quite near by a slight kissing sound made with the lips to the back of one's hand—a very good imitation of one of their calls. Their usual call, however, is a loud, clear whistled El'-ep-aí-o, from which it gets its native name. Another common note is a slight variation of the above, sounding like a whistled Tōo-weé-oo; still another frequently heard is a sharp Wheet', whtó. When approaching one it scolds in words sounding like Chrr, chrr. In all I have counted seven different calls or notes from this bird. They have a habit, when excited, of spreading their tail and flipping it up to almost right angles with their body. They are not at all afraid, as I have had them approach within twenty inches of my face.

The Elepaio is always keenly alert for insects, and occasionally takes them on the wing with an audible snap of the bill. In the large series of these birds taken all had their stomachs perfectly gorged with insects and larvæ. I have frequently timed them to see how many insects they really would destroy in five minutes. One feeding almost within reach of me in that length of time caught first, a leaf-hopper; second, a small moth; third, another leaf-hopper; and fourth, a caterpillar that required three or four gulps to swallow, it was so large. The strange thing is they seem to be always feeding, so the rapidity of their digestive power is remarkable. To birds other than their own tribe the Elepaio is a pugnacious little body, and I have seen them chase the larger Apapane (*H. sanguinea*) away from a particularly good feeding ground. By February 1 the mating season had arrived for these birds, and I observed them sporting with their mates. As yet I have been unable to find their nests. On March 14, however, I shot a female with an egg, now in the Bishop Museum, that was almost ready for exclusion.

This bird shows the most remarkable range of variations in its plumage, so that a very large series is required to gain any adequate idea of the age and seasonal variations. Not wishing to kill more than was absolutely necessary, the number of these birds taken was confined to six to ten each month, nothing near a duplicate has yet been found. For example, I have before me a male taken January 3: bill, entirely black; feet and tarsus, dark with bluish cast; eye, dark hazel; general color above, tawny ochraceous, brightest on upper tail-coverts and sides of neck; top of head very little brighter than mantle; the feathers of the mantle are broadly tipped with brighter ochraceous which gives the mantle an indistinctly mottled appearance; the rufous of the upper tail-coverts extends as a band entirely around the anal region of the body, although not so bright on the under tail-coverts; wing-coverts tipped with bright rufous and without any trace of white; throat, breast and flanks, tawny ochraceous; belly and tips of tail feathers, except the two middle ones, white; testes enlarged, .29X.19. This was a bird that would evidently breed the coming season. Length, 5.16; wing, 2.63; tail, 2.25; tarsus, .93; culmen, .50; depth at nostrils, .19; mid-toe and claw, .62. A male taken March 15, with plumage exactly the same shade of color, with possibly a shade less of rufous on flanks and breast, has

the immature yellowish under mandible with only the under part at tip dark. Length, 5.50; wing, 2.56; tail, 2.25; tarsus, .87; mid-toe and claw, .56; testes, minute.

The approach to maturity in these birds, as shown by our large series, is as follows: First, the ear-coverts become dusky; next, the under mandible becomes black with only a narrow line of yellowish along the cutting edge. At this period the buffy white of the mid-breast has changed to pure white, and a buffy white patch about one and one-half the length of the culmen appears under the chin. The dusky area about the ear-coverts has increased in size so they extend from a line with the pupil of the eye to half-way down the neck. Fleckings of dusky appear in the rufous on each side of under neck. The tips of the greater and middle wing-coverts show white in the centre surrounded with the bright rufous. Buffy white appears on the lores, the coloring on the head becomes less ochraceous. Thus the changes go on until we have the well known adult plumage, with the pure white tail-coverts; white tips to the wing-coverts; black on throat, preceded by the restricted white area about as long as the culmen. The pattern of this white patch varies in each individual, but in fully mature specimens a narrow band of white extends entirely around the forehead at the base of the upper mandible, widening out over the lores—which are entirely white, but with black bases to the feathers—and joins broadly with the white of the throat. At the base of the lower mandible is a small patch of black; on the lower neck the white gradually disappears as tips to the feathers of the neck and fore breast; the mantle is brownish with rufous cast and has indistinct white tips to the feathers of the lower part. Our series shows no difference between the male and female. Confined to Oahu island. Length, 5.50; wing spread, 7.75; wing, 2.51; tail, 2.18; tarsus, .83; culmen, .54; mid-toe and claw, .56.

***Vestiaria coccinea*, Forster. Iiwi.**

This beautiful bird, once so common on the island, is now very scarce. During the entire four months I have been collecting only two have been secured. Another has recently been presented to the Museum through the courtesy of Dr. Huddy of Honolulu. However, these birds are probably more abundant in the Waianae mountains, which I have not been able to explore because of the

quarantine. On February 27, while collecting in the large ohia forest of Waiolani mountain, at an elevation of 1300 feet, I saw an Iiwi enter a fresh-built nest in an ohia tree (*Metrosideros polymorpha*). I secured the old bird and the nest; unfortunately, however, there were no eggs, the nest not being quite complete. The bird is a female in beautiful summer plumage. General color, a bright vermillion; wings and tail, black; inner two feathers of secondaries, white; feet, light vermillion; bill, vermillion, darker at tip; eye, hazel. The stomach contained the remains of insects and ohia stamens. Length, 6; wing, 2.87; tail, 2; tarsus, 1.12; culmen, .97. The nest was placed about 40 feet from the ground, and was well secured in the crotch of three small branches, at the end of a big limb standing straight up for 12 feet without any lower branches. The nest was completely hidden by leaves and the yellow ohia blooms; the exterior was composed of club moss and small twigs; the inside was of moss, fern pulu, and hair-like fibres from leaves; outside it was 5-7 in diameter; inside, 3.5-2; depth, 2.

Himatione sanguinea, Gmel. Apapane.

While the Apapane is by no means abundant it is still not uncommon in the mountains of Oahu. They are found in the ohia forests at an elevation of 1000 feet. These birds begin to pair about the middle of February, and I frequently saw them sporting as they flew across the cañon. They may be easily decoyed by giving their call of Cheep in a soft whistle. On February 27 three of these birds alighted on an ohia tree quite near me, and one which proved to be a male spread out his wings like a strutting turkey cock and danced gracefully to the great satisfaction of the spectators. These birds when flying make a drumming noise with their wings which sounds like the tapping of a woodpecker in the distance.

On March 3, at an elevation of 1200 feet on Waiolani mountain, I heard an Apapane singing from an ohia tree. There were two, a male and female; I gave the call, a faint cheep, cheep, and the female flew into the tree under which I was standing and was taken. The male continued to sing, his notes being a sweet whistled Hop-o-lee, ch-ch-ch, lee-lee, cha-lee, cha-lee, cha-lee, liquid and beautiful, with frequent changes in the arrangement and abbreviations of the above sounds. They usually, as in this case, continue moving rapidly about from one branch to another,

taking good care to keep themselves well screened behind thick bunches of leaves, for they are a suspicious and wary bird. After watching this bird for some time I hardened my heart and added him to the collection in the Museum. I have found five nests of this species, but as yet no eggs. The nests are usually in the ohia trees. A fresh nest taken February 23 measures 5×5 in diameter on the outside, and 2.25×2 on the inside; depth, 1.10. This nest was found in an ohia tree about 20 feet from the ground; elevation, 1300 feet. The outside of the nest was of moss interwoven with small Ieie roots, with a foundation of small twigs; the inside was of fine hair-like dried fibres of leaves which looked almost like horse-hair. With a good microscope I carefully examined the stomach contents of ten Apapane; remains of insects and larvæ together with bits of stamens and pollen from the ohia were found in all.

The Apapane is a bright crimson in color, brighter on the head; slightly gray shading into white on lower belly, and under tail-coverts white; tails and wings, black. Our series of twenty specimens will not corroborate Mr. Wilson's statement in the "*Aves Hawaienses*" that "the females differ from the males in having the general crimson of the plumage of a distinctly lighter shade, while the crimson on the outer edge of the secondaries is of the same shade as the rest of the plumage, whereas in the males it is of much lighter tint." In the birds before me all the fully adult specimens, both male and female, have the edging of the secondaries the same color as the mantle; while in the immature of both sexes the edging of the secondaries has a yellowish color; they probably do not lose this sign of immaturity until the second year, as I have taken birds that were nesting which still showed a faint trace of orange-yellowish on their secondaries. In general color the difference in the sexes is so slight as to often be unappreciable.

A young female just beginning to assume the first indication of red was taken February 27. The general color of this bird was grayish tinged with dirty ochraceous; belly and under tail-coverts, white; a slight trace of crimson appearing on head and mantle; edgings on the outer webs of the secondaries and wing-coverts, reddish buff; base of lower mandible, yellowish; a slight white marking near the end of the outer webs of the second, third and fourth primaries as in adult birds. This specimen measured as follows: Length, 5; spread of wing, 7; wing, 2.53; tail,

1.77; tarsus, .83; culmen, .61; its depth at base, .19. This bird is found on all the islands.

ORDER PASSERES.

FAMILY **Drepanidæ.**

Chlorodrepanis chloris, Cab. Amakihi.

Although these birds are not rare I have only secured three. They are so small and their color matches so well the green of the foliage as to make it almost impossible to distinguish them. Their faint little note, sounding like ss ss hissed in a subdued tone, seems to come from almost anywhere and is a poor guide to their location. They are found on the wooded mountain ridges and in the cañons at an elevation of about 1100 feet. An immature male (No. 1335) was taken January 30 on Waiolani mountain at an elevation of 1087 feet. This bird was busily engaged in looking for small insects among the branches of a koa tree. Its stomach contained five small larvæ and the remains of two adult flies. On February 21 I shot another (No. 1343) while feeding on small insects which I saw it picking from the leaves and branches of an ohia bush at an elevation of 1049 feet. This bird was accompanied by another which I thought to be its mate, for it soon returned to the same bush and was taken (No. 1344). These two specimens, a male and female, were in very immature plumage and their organs showed no signs of development; so instead of being mated they may have been merely members of the same brood.

All of these specimens have the well curved horn-colored bill, with light yellowish on the base of the lower mandible. The feet and tarsus are dark with a raw umber tint. All have the greater and middle wing-coverts tipped with whitish, surrounded with a faint trace of olive green; primaries and secondaries dark with greenish edge to outer webs, which merges into light gray towards the tips; secondaries with more or less white on upper part of inner web; tail, dark with greenish outer edge to all the feathers except the two outer feathers, which show a faint edging of grayish; lores, grayish; back, tinged with olive green. In No. 1335, evidently an older bird, the coloring is brighter on the sides of head above the ear-coverts; there is also a bright yellow superciliary stripe; under parts, buffy white streaked with yellowish on throat and breast; lower abdomen and under tail-coverts, white. Following are the measurements of the three specimens: No. 1335. ♂ Length, 4.5; spread of wing, 7.75; wing, 2.56; culmen, .62; its depth at nos-

tril, .19; tarsus, .75; mid-toe and claw, .68. No. 1343. ♂ Length, 4.5; spread of wing, 6.5; wing, 2.50; tail, 1.50; culmen, .56; its depth at nostril, .19; mid-toe and claw, .63. No. 1344. ♀ Length, 4.75; spread of wing, 6.5; wing, 2.43; tail, 1.50; culmen, .56; its depth at nostril, .19; mid-toe and claw, .75. Confined to Oahu island.

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- 6775 Tortoise-shell armlet. New Guinea.
- 6776 Boar tusk. Solomon Ids.
- 6777 Armlets braided from Gleichenia fibre. Solomon Ids.
- 6778 Finger ring of tortoise-shell. Samoan Ids.
- 6779 Forehead ornament, disk of shell. Solomon Ids.
- 6780 Fish hooks (4). Solomon Ids.

- 6785 Armlet of carved shell. New Guinea.
6786 Rings of *Conus* shell (2). New Guinea.
6795 Fisherman's idol in rough lava, Molokai. Hawaiian.
6796 Stone dish for offerings to an idol. Hawaiian.
6797 Stone kapa presser. Hawaiian.
6798 Grass hula dress (2). Hawaiian.
7530 Poi pounder of common form. Hawaiian.
8129 Tree carved and hollowed for a drum (Fig. 1). Malekula,
New Hebrides.
8130 Similar sacred drum, but smaller. Malekula, New Hebrides.
8131 Idol carved from the lower stem of a tree fern (Fig. 2).
Malekula, New Hebrides.
8132 Similar idol, both painted red and white (Fig. 2). Male-
kula, New Hebrides.
8133 Image composed of sticks and human crania (Fig. 3).
Malekula, New Hebrides.
8134 Image composed of sticks and human crania (Fig. 3).
Malekula, New Hebrides.
8135 Image similar to last but with cotton head piece. Malekula,
New Hebrides.
8136 Phallic image of sticks and gum. Malekula, New Hebrides.
8137 Masks of light wood painted red (3). Malekula, New
Hebrides.
8140 Fine woven mat dress of a woman. Malekula, New Hebrides.
8143 Mat dresses for women (2). Malekula, New Hebrides.
8186 Wooden awa bowl with twelve legs. Given by Lieut. W. E.
Safford. Samoa.
8187 Awa cup of coconut beautifully tinted. Given by Lieut.
W. E. Safford. Samoa.
8188 Carved wood upete for siapo. Given by Lieut. W. E.
Safford. Samoa.
8189 Portion of shell for scraping siapo. Given by Lieut. W. E.
Safford. Samoa.
8190 *Pandanus* baskets (4). Given by Lieut. W. E. Safford.
Samoa.
8193 Fan of open structure. Given by Lieut. W. E. Safford.
Samoa.
8571 Poi umeke of large size, partly hollowed out. Given by H.
G. K. Lyman. Hawaiian.
8572 *Pandanus* leaf prepared for mat making. Hawaiian.

- 8573 Pandanus leaf prepared for mat making, finer kind. Hawaiian.
- 8574 Pandanus mat partly made, to show procedure. Hawaiian.
- 8579 Cloak made from the feathers of *Apteryx mantelli*. New Zealand.
- 8580 Stone dish of large size found in an heiau (Fig. 5). Hawaiian.
- 8581 *Patu of schist $13\frac{1}{2}$ inches long. Chatham Ids.
- 8582 Patu similar to last, $12\frac{1}{4}$ in. long. Chatham Ids.
- 8583 Patu similar to last, $12\frac{1}{2}$ in. long. Chatham Ids.
- 8584 Patu similar to last, 12 in. long. Chatham Ids.
- 8585 Adz head of fine basalt, $8\frac{1}{2}$ in. long. Chatham Ids.
- 8586 Adz head of fine basalt, $13\frac{1}{2}$ in. long. Chatham Ids.
- 8587 Nine basalt adz heads from $2\frac{3}{4}$ in. to $8\frac{1}{4}$ in. long. Chatham Ids.
- 8597 Flint adz head unfinished. Chatham Ids.
- 8598 Flint adz heads (2). Chatham Ids.
- 8600 Adz, complete. Chatham Ids.
- 8601 Flint chisels (2), 4 in. and $2\frac{1}{2}$ in. long. Chatham Ids.
- 8603 Basalt chisel, $4\frac{1}{4}$ in. long. Chatham Ids.
- 8604 Basalt chisel, 11 in. long. Chatham Ids.
- 8605 Adz head of basalt, 7 in. long. Chatham Ids.
- 8606 Sandstone grindstones (2). Chatham Ids.
- 8608 Blubber knives of slate (2). Chatham Ids.
- 8610 Blubber knives of stone (2). Chatham Ids.
- 8613 Blubber knives of chert (2). Chatham Ids.
- 8615 Mere or double-edged club of schist, 14 in. long. Chatham Ids.
- 8616 Mere of similar material, $10\frac{1}{4}$ in. long. Chatham Ids.
- 8617 Musical instrument of the bone of an albatross. Chatham Ids.
- 8618 Bone eel-threaders (2). Chatham Ids.
- 8620 Heitiki or amulet of bone. Chatham Ids.
- 8621 Breast and ear ornaments of cachelot teeth (2). Chatham Ids.
- 8623 Bone heads of bird spears (2). Chatham Ids.
- 8625 Bone needles, straight and curved (2). Chatham Ids.
- 8627 Fish hooks of bone, carved (7). Chatham Ids.
- 8792 Shell axe mounted, *Tridacna* shell (Fig. 8). Gilbert Ids.
- 8793 Shell adze mounted, *Tridacna* shell (Fig. 8). Gilbert Ids.
- 8794 Rasps made of sunfish skin bound to wood handles (4, Fig. 9). Gilbert Ids.

*This collection of Moriori implements will be explained at greater length with illustrations in the Memoirs of this Museum. It is of great value and interest.

- 8798 Scraper of tortoise shell with a wood handle. Micronesia.
- 8799 Combs carved from wood (2). Gilbert Ids.
- 8801 Head and neck ornament. Ruk, Caroline Ids.
- 8802 Wooden spear with blunt barbs. Ruk, Caroline Ids.
- 8803 Necklace of red Chama shell disks, very choice. Ruk,
Caroline Ids.
- 8804 Necklaces of Engina shells (2). Marshall Ids.
- 8806 Necklace of Neritina shells. Marshall Ids.
- 8807 Necklace of Cardium shells. Marshall Ids.
- 8808 Necklaces of Melampus shells (3). Marshall Ids.
- 8812 Hawaiian kapa, 3 specimens. Hawaii.

MOUNTED SKELETONS.

- 6801 *Arctocephalus lobatus*, Gray. Australia.
- 6802 *Halicore australis*, Cuvier. (Dugong.) Australia.
- 6803 *Macropus giganteus*, Zimmermann. Australia.
- 6804 *Ornithorhynchus anatinus*, Shaw. Australia.
- 6805 *Dacelo gigas*, Bodd. New South Wales.
- 6806 *Menura superba*, Davis. (Lyre Bird.) New South Wales.
- 6807 *Nestor notabilis*, Gould. (Kea.) New Zealand.
- 6808 *Dromæus novæ-hollandiæ*, Latham. (Emu.) Australia.
- 6809 *Eudyptila minor*, Gray. (Penguin.) New South Wales.
- 6810 *Hydrosaurus varius*, Gray. (Lace-lizard.) New South
Wales.
- 6811 *Cistudo clausa*, Owen. Indiana, U. S. A.
- 8200 *Diomedea brachyura*, Temminck. Northern Pacific.
- 6719 *Apteryx mantelli*, Bartl. New Zealand.
- 8141 Male. New Hebrides.
- 8634 Ear drums of *Physeter macrocephalus* (2). Chatham Ids.

MOUNTED SKINS.

- 8199 *Trichechus obesus*, Illiger. (Pacific Walrus.) Alaska.
- 8201 *Petaurus breviceps papuanus*, Thomas. New Britain.
- 8202 *Myrmecobius fasciatus*, Waterhouse. Western Australia.
- 8203 *Pteropus melanopogon*, Schleg. New Britain.

- 8204 *Pteropus poliocephalus*, Temminck. New South Wales.
 8205 *Pteropus griseus*, E. Geof. Duke of York Id.
 8206 *Pteropus capistriatus*, Peters. New Britain.
 8207 *Harpyia major*, Dobs. Duke of York Id.
 8208 *Callorhinus ursinus* (Fur Seal), Gray. ♂ Pribilov Ids.
 8209 *Callorhinus ursinus* (Fur Seal), Gray. ♀ Pribilov Ids.

BIRD SKINS.

(Those marked * have been mounted by Mr. Bryan.)

- 8705 *Aluda arvensis*. ♂ * Oahu. Coll. A. Seale.
 8706 *Aluda arvensis*. ♀ * Oahu. Coll. A. Seale.
 8707 *Acridotheres tristis* (Mina). ♂ Oahu. Coll. A. Seale.
 8708 *Fulica alae* (Albino). ♂ Maui. Given by G. P. Wilder.
 8709 *Gallinula sandwicensis*. ♂ * Oahu. Coll. A. Seale.
 8710 *Calidris arenaria*. ♂ * Oahu. Coll. A. Seale.
 8711 *Charadrius fulvus*. ♂ * Oahu. Coll. A. Seale.
 8712 *Charadrius fulvus*. ♂ Oahu. Coll. A. Seale.
 8713 *Charadrius fulvus*. ♂ Oahu. Coll. A. Seale.
 8714 *Charadrius fulvus*. ♂ Oahu. Coll. A. Seale.
 8715 *Chasiempis gayi*. ♂ * Oahu. Coll. A. Seale.
 8716 *Chasiempis gayi*. ♂ * Oahu. Coll. A. Seale.
 8717 *Charadrius fulvus*. ♂ Oahu. Coll. A. Seale.
 8718 *Charadrius fulvus*. ♂ Oahu. Coll. A. Seale.
 8719 *Charadrius fulvus*. ♂ Oahu. Coll. A. Seale.
 8720 *Charadrius fulvus*. ♂ Oahu. Coll. A. Seale.
 8721 *Asio accipitrinus*. ♂ Oahu. Coll. A. Seale.
 8722 *Charadrius fulvus*. ♂ (Fall plum.) Hawaii. Given by H. W. Henshaw.
 8723 *Larus occidentalis*. ♀ Oahu. Coll. A. Seale.
 8724 *Larus occidentalis*. ♂ Oahu. Coll. A. Seale.
 8725 *Sterna maxima*. ♂ Oahu. Coll. A. Seale.
 8726 *Arenaria interpres*. ♂ Oahu. Coll. A. Seale.
 8727 *Arenaria interpres*. ♂ Oahu. Coll. A. Seale.
 8728 *Turtur chinensis*. Oahu. Coll. A. Seale.
 8729 *Telespiza cantans*. ♀ Laysan Id. By Exchange.
 8730 *Telespiza cantans*. ♀ Laysan Id. By Exchange.
 8731 *Telespiza cantans*. ♀ Laysan Id. By Exchange.
 8732 *Telespiza cantans*. ♀ Laysan Id. By Exchange.

- 8733 *Acrocephalus familiaris*. ♂ Laysan Id. By Exchange.
8734 *Acrocephalus familiaris*. ♀ Laysan Id. By Exchange.
8735 *Acrocephalus familiaris*. ♀ Laysan Id. By Exchange.
8736 *Himatione freethi*. ♀ Laysan Id. By Exchange.
8737 *Himatione freethi*. ♂ Laysan Id. By Exchange.
8738 *Porzanula palmeri*. ♂ Laysan Id. By Exchange.
8739 *Porzanula palmeri*. ♀ Laysan Id. By Exchange.
8740 *Porzanula palmeri*. ♂ Laysan Id. By Exchange.
8741 *Porzanula palmeri*. ♀ Laysan Id. By Exchange.
8742 *Diomedea nigripes*. ♀ Midway Id. By Exchange.
8743 *Diomedea immutabilis*. Laysan Id. By Exchange.
8744 *Anas laysanensis*. ♀ Laysan Id. By Exchange.
8745 *Anas laysanensis*. ♂ Laysan Id. By Exchange.
8746 *Diomedea immutabilis*. ♂ Laysan Id. By Exchange.
8747 *Sula cyanops*. ♀ Laysan Id. By Exchange.
8748 *Sula cyanops*. ♂ Laysan Id. By Exchange.
8749 *Sula piscator*. ♂ French Frigates Id. By Exchange.
8750 *Sula piscator*. ♂ Laysan Id. By Exchange.
8751 *Sula sula*. ♀ Midway Id. By Exchange.
8752 *Sula sula*. ♂ Lisianski Id. By Exchange.
8753 *Phaëthon rubricauda*. ♂ Laysan Id. By Exchange.
8754 *Phaëthon rubricauda*. ♂ Kermadec Ids. By Exchange.
8755 *Phaëthon rubricauda*. ♂ Kermadec Ids. By Exchange.
8756 *Fregata aquila*. Laysan Id. By Exchange.
8757 *Fregata aquila*. Laysan Id. By Exchange.
8758 *Haliplana fuliginosa*. ♀ French Frigates Id. By Exchange.
8759 *Haliplana fuliginosa*. ♀ French Frigates Id. By Exchange.
8760 *Gygis alba kittlitzii*. Laysan Id. By Exchange.
8761 *Sterna lunata*. Laysan Id. By Exchange.
8762 *Œstrelata hypoleuca*. ♂ Laysan Id. By Exchange.
8763 *Œstrelata hypoleuca*. ♂ Laysan Id. By Exchange.
8764 *Œstrelata hypoleuca*. ♂ Laysan Id. By Exchange.
8765 *Puffinus cuneatus*. ♀ Laysan Id. By Exchange.
8766 *Puffinus cuneatus*. ♀ Laysan Id. By Exchange.
8767 *Bulweria bulweri*. ♂ French Frigates Id. By Exchange.
8768 *Bulweria bulweri*. ♂ French Frigates Id. By Exchange.
8769 *Puffinus nativitatis*. ♀ French Frigates Id. By Exchange.
8770 *Puffinus nativitatis*. ♂ French Frigates Id. By Exchange.
8771 *Anous stolidus*. ♀ French Frigates Id. By Exchange.
8772 *Micranous hawaiiensis*. ♀ Laysan Id. By Exchange.

- 8773 *Charadrius fulvus*. ♀ Laysan Id. By Exchange.
- 8774 *Charadrius fulvus*. ♀ Laysan Id. By exchange.
- 8775 *Strepsilas interpres*. ♀ Laysan Id. By Exchange.
- 8776 *Strepsilas interpres*. ♀ Laysan Id. By Exchange.
- 8777 *Totanus incanus*. ♀ Laysan Id. By Exchange.
- 8778 *Numenius tahitiensis*. ♀ Laysan Id. By Exchange.
- 9008 *Gygis alba kittlitzi*. ♂ Laysan Id. By Exchange.
- 9009 *Chrysoenas luteovirens*. ♂ Fiji. By Purchase.
- 9010 *Chrysoenas luteovirens*. ♂ * Fiji. By Purchase.
- 9011 *Chrysoenas luteovirens*. ♀ Fiji. By Purchase.
- 9012 *Chrysoenas luteovirens*. ♀ Fiji. By Purchase.
- 9013 *Chrysoenas luteovirens*. ♀ Fiji. By Purchase.
- 9014 *Chrysoenas luteovirens*. ♀ Fiji. By Purchase.
- 9015 *Chrysoenas luteovirens*. ♀ * Fiji. By Purchase.
- 9016 *Chalcophaps chrysochlora*. ♂ * Queensland. By Purchase.
- 9017 *Chalcophaps chrysochlora*. ♂ Queensland. By Purchase.
- 9018 *Macropygia phasianella*. ♂ By Purchase.
- 9019 *Macropygia phasianella*. ♀ * By Purchase.
- 9020 *Macropygia phasianella*. ♂ * By Purchase.
- 9021 *Megaloprepia magnifica*. ♀ * By Purchase.
- 9022 *Megaloprepia magnifica*. ♂ By Purchase.
- 9023 *Megaloprepia magnifica*. ♀ By Purchase.
- 9024 *Megaloprepia magnifica*. ♀ By Purchase.
- 9025 *Ptilopus perousei*. * Fiji. By Purchase.
- 9026 *Ptilopus perousei*. Fiji. By Purchase.
- 9027 *Ptilopus ponapensis*. Fiji. By Purchase.
- 9028 *Ptilopus ponapensis*. * Fiji. By Purchase.
- 9029 *Ptilopus rarotongensis*. * Fiji. By Purchase.
- 9030 *Psitteuteles chlorolepidotus*. * Queensland. By Purchase.
- 9031 *Psitteuteles chlorolepidotus*. * Queensland. By Purchase.
- 9032 *Cacatua galerita*. * Queensland. By Purchase.
- 9033 *Trichoglossus novæ-hollandiæ*. * Queensland. By Purchase.
- 9034 *Trichoglossus novæ-hollandiæ* (7). Queensland. By Purchase.
- 9041 *Aprosmictus cyanopygius* (4). ** Queensland. By Purchase.
- 9045 *Glossopsittacus porphyrocephalus*. Queensland. By Purchase.
- 9046 Seven unidentified species. * By Purchase.
- 9053 *Ægintha temporalis* (4). ** Queensland. By Purchase.
- 9057 Two unidentified species. Queensland. By Purchase.

- 9059 *Erythrura pealii*. * Queensland. By Purchase.
- 9060 *Dicaeum hirundinaceum* (2). ** Queensland. By Purchase.
- 9062 *Machærorhynchus flaviventer*. ♀ * Queensland. By Purchase.
- 9063 *Machærorhynchus flaviventer* (8). ♂ * Queensland. By Purchase.
- 9071 *Machærorhynchus flaviventer* (5). ♀ Queensland. By Purchase.
- 9076 Four unidentified specimens. ** By Purchase.
- 9081 *Malurus elegans*. ♂ * Queensland. By Purchase.
- 9082 *Malurus elegans* (2). ♀ Queensland. By Purchase.
- 9084 *Malurus melanocephalus* (6). ♂ * New South Wales. By Purchase.
- 9090 *Malurus melanocephalus*. ♀ * New South Wales. By Purchase.
- 9091 Four unidentified specimens. ** By Purchase.
- 9095 *Ptilotis polygramma*. * Queensland. By Purchase.
- 9096 *Ptilotis limbata* (3). ** Queensland. By Purchase.
- 9999 *Dacelo gigas*. ♂ Queensland. By Purchase.
- 9100 *Dacelo gigas*. ♀ Queensland. By Purchase.
- 9101 *Alcyone azurea*. ♀ * Queensland. By Purchase.
- 9102 *Tanyiptera sylvia*. * Queensland. By Purchase.
- 9103 *Halcyon macleayi* (6). * Queensland. By Purchase.
- 9109 Two unidentified specimens. * By Purchase.
- 9111 *Chalcococcyx plagosus*. ♂ * Queensland. By Purchase.
- 9112 *Chalcococcyx plagosus*. ♀ * Queensland. By Purchase.
- 9113 *Rhipidura rufifrons*. * Queensland. By Purchase.
- 9114 *Rhipidura tricolor*. * Queensland. By Purchase.
- 9115 *Malurus* sp. * Queensland. By Purchase.
- 9116 Two unidentified specimens. * By Purchase.
- 9118 *Ptilorhis paradisea* (9). ♂ * Queensland. By Purchase.
- 9127 *Ptilorhis paradisea* (2). ♀ * Queensland. By Purchase.
- 9129 *Ptilotis auricomis*. New South Wales. By Purchase.
- 9130 *Caprimulgus macrurus*. ♂ Queensland. By Purchase.
- 9131 *Cracticus quoyi* (3). * Queensland. By Purchase.
- 9134 *Merops ornatus*. * Queensland. By Purchase.
- 9135 *Myzomela obscura*. * Queensland. By Purchase.
- 9136 *Myzomela sanguinolenta*. ♂ * By Purchase.
- 9137 *Myzomela jugularis*. ♂ * By Purchase.
- 9138 *Myiagra azureicapilla*. ♂ * By Purchase.

- 9139 *Cinnyris zeylanica*. ♂ * Ceylon. By Purchase.
 9140 *Cinnyris comorensis*. ♂ * Ceylon. By Purchase.
 9141 *Ælurædis viridis* (2). ♀ * Queensland. By Purchase.
 9143 Six unidentified specimens.*** By Purchase.
 9149 *Haliplana fuliginosa* (6). ♂ Oahu. Coll. A. Seale.
 9155 *Haliplana fuliginosa*. ♀ Oahu. Coll. A. Seale.
 9156 *Anous stolidus* (3). ♂ Oahu. Coll. A. Seale.
 9159 *Totanus incanus*. ♀ Oahu. Coll. A. Seale.
 9160 *Phasianus colchicus* ♀ * Oahu. Coll. A. Seale.
 9161 *Charadrius fulvus*. ♀ * Oahu. Coll. A. Seale.
 9162 *Totanus incanus*. ♂ * Oahu. Coll. A. Seale.
 9163 *Totanus incanus*. ♀ * Oahu. Coll. A. Seale.
 9164 *Anous hawaiiensis* (2). ♂ Oahu. Coll. A. Seale.
 9166 *Dafila acuta*. ♂ Oahu. Coll. A. Seale.
 9167 *Dafila acuta*. ♀ Oahu. Coll. A. Seale.
 9168 *Anas wyvillianus*. ♂ Oahu. Coll. A. Seale.
 9169 *Porphyrio melanotus*. ♂ Oahu. Coll. A. Seale.
 9170 *Nycticorax nycticorax*. ♂ Oahu. Coll. A. Seale.
 9171 *Arenaria interpres*. ♀ Oahu. Coll. A. Seale.
 9172 *Charadrius fulvus* (2). ♂ Oahu. Coll. A. Seale.
 6740 Emu eggs (2). Queensland. Purchased.

MOLLUSCA.

(The numbers are not given as they will be altered somewhat for the Catalogue of the entire collection of Mollusca, now in preparation.)

- Octopus punctatus*, Gabb. Cast en papier maché. North Pacific.
 cuvieri, D'Orb. Torres Strait.
Argonauta argo, Linn. ♂ 3 stages in alcohol. Mediterranean.
Sepiola rondeleti, D'Orb.; in alcohol. Mediterranean.
Nautilus pompilius, Linn., bisected; in alcohol. Torres Strait.
Pneumodermon mediterraneum, Ben.; in alcohol. Mediterranean.
Clionopsis krohnii; in alcohol. Mediterranean.
Murex blainvillei, Payr. Naples.
 carboneri, Jous.
 cornutus, Linn. W. Africa.
 foliatus, Martyn. Japan.
 malabaricus, Mel. Persian Gulf.

- Murex mitræformis*, Sowerby. Natal.
 scolopax, Dillwyn. Persian Gulf.
 senegalensis (var. *calcar*), Gmel. Japan.
- Muricidea hexagonus*, Lamarck. Penang.
- Phyllonotus endivia*, Lam. Philippines.
- Chicoreus saxatilis*, Linn. Indo-Pacific.
- Urosalpinx contracta*, Reeve. Aden.
- Trophon flindersi*, A. & A. Victoria, Australia.
- Purpura situla*, Reeve. Aden.
 cingulata, Linn. Cape Town.
 lapilloides, Conrad. California.
- Sistrum adelaidensis*, Crosse. Victoria, Australia.
 meyendorffi, Cab. Durban, Natal.
- Triton concinnus*, Reeve. Hawaiian Ids.
 eburneus, Crosse. Victoria, Australia.
 maculosus, Gmel. Mauritius.
 nodiferus, Lam. Indo-Pacific.
 sinensis, Rve. China.
 verrucosus, Rve. Australia.
- Ranella concinna*, Dunker. Kurachi.
- Fusus australis*, Quoy. Australia.
 distans, Lam. Pacific.
 probosciferus, Lam. N. Australia.
- Peristernia maculata*, Rve. Australia.
 nassatula, Lam. Mauritius.
- Siphonalia dilatata*, Quoy. New Zealand.
 maxima, Tryon. Tasmania.
- Fulgur perversa*, Linn. Florida.
 perversa, egg cases. Florida.
- Cominella maculata*, Martyn. Poverty Bay, New Zealand.
- Latrunculus mollianus*, Chem. Kurachi.
 valentinianus, Swainson. Red Sea.
- Bullia kurachiensis*, Angus. Kurachi.
 persica, Smith. Kurachi.
 vittata, Linn. Ceylon.
 diluta, Krauss. Natal.
- Nassa nodifera*, Paris. Aden.
 obookensis, Jouss. Aden.
 persica, Martyn. Aden.
 pullus, Linn. Aden.

- Turbinella rapa*, Lam. Ceylon.
 scolymus, Lam. West Indies.
Lyria deliciosa, Mont. New Caledonia.
Turricula costellaris, Lam. Singapore.
Oliva araneosa, Lam. Panama.
 araneosa (var. *polpastra*), Duclos. Straits of Magellan.
Columbella dalli, E. A. Smith. Vancouver.
Bela brachystomoides, Cpr. California.
 trevelyan, Turton. Norway.
Conus acuminatus, Hwass. Red Sea.
 anemone, Lam. Australia.
 araneosus, Hwass. Philippines.
 archiepiscopus, Hwass. East Indies.
 betulinus, Linn. Singapore.
 characteristicus, Gmel.
 genuanus, Hwass. West Africa.
 interruptus, Brod. Panama.
 janus, Hwass. Cochin China.
 lithoglyphus, Mensch. East Indies.
 maldivus, Hwass. Mauritius.
 mercator, Linn. West Indies.
 rattus, Hwass. Indo-Pacific.
 stercus-muscarum, Linn. Pelew Ids.
 vautieri, Kiener. Marquesas Ids.
Strombus accipitrinus, Lam. West Indies.
 gigas, Linn. Bahamas.
 melanostoma, Swainson. Philippines.
 peruvianus, Swainson. Panama.
Dolium maculatum, Lam. Singapore.
Maleo ringens, Swainson. Pacific.
Struthiolaria papulosa, Martyn. Australia.
Cassis coronulata, Lam. Philippines.
Cypræa childreni, Gray. Borneo.
 cribellum, Gaskoin. Mauritius.
 cumingi, Gray. Paumotu Arch.
 cylindrica, Born. Australia.
 indica, Gmelin. S. Pacific.
 picta, Gray. Cape de Verde Ids.
 piperita, Solander. Australia.
 polita, Roberts. Japan.

- Cypræa pustulata*, Lam. Panama.
 stercoraria, Linn. Africa.
Trivia sphærulea, Mighels. Paumotu Arch.
Natica cancrena, Linn. West Indies.
Vivipara glauca, Linn.
Nerita atropurpurea, Recl. Singapore.
Phasianella bulimoides, Lam. Australia.
Astraliun sulcatum, Martyn. New Zealand.
Turbo marmoratus, Linn. China.
Haliotis pulcherrima, Martyn.
Fissurella crassa, Lam. Valparaiso.
Acmæa mitra, Esch. California.
 pelta, Esch. California.
Cryptochiton stelleri, Midd. California.
Haminea rotundata, A. Adams. Australia.
 virescens, Sowerby. Pitcairn Id.
Hydatina physis, Linn. Mauritius.
Dollabella scapula, Martyn. Port Dennison.
Rhytida lamprea, Pfr. Tasmania.
Zonites algira, Linn. Spain.
Flammulina fordei, Brazier. Tasmania.
Alexia meridionalis, Brazier. Tasmania.
Gundlachia beddomei, Pett. Tasmania.
Gastrochæna mumia, Spengler. Singapore.
Pisidium tasmanicum, Ten-Woods. Tasmania.
Unio æsopus, Green. Mississippi River.
 camptodon, Say. New Orleans.
 clavus, Lam. Ohio River.
 coccineus, Lea. Ohio River.
 foliatus, Hild. Ohio River.
 fragosus, Conrad. Ohio River.
 gracilis, Barnes. Ohio River.
 graniferus, (var.) Lea. Cumberland River.
 iris, Lea. Ohio River.
 jejunus, Lea. Virginia.
 lachrymosus, Lea. Miami Canal.
 obliquus, Lam. Ohio.
 phaseolus, Hild. Ohio.
 plicatus, Lesueur. Ohio River.
 rugosa, Barnes. Ohio River.

- Unio schoolcraftia*, Lea. Michigan.
shepardianus, Lea. Georgia.
spatulata, Lea. Ohio.
subovatus, Barnes. Ohio.
trigonus, Lea. Ohio River.
ventricosus, Barnes. Illinois.
verrucosus, Barnes. Miami River.
zigzag, Lea. Ohio River.
Margaritana calceola, Lea. Genesee River.
deltoidea, Lea. Ohio River.
Anodonta edentula, Say. New York.
Leda minuta, Fabr. Norway.
Yoldia lenticula, Möller. Spitzbergen.
Arca modiola, Linn. Mediterranean.
navicularis, Brod. China.
tetragona, Poli. Mediterranean.
Glycymeris striatularis, Lam. Australia.
Pecten asperimus, Lam. Tasmania.
aspersus, Lam. Mediterranean.
clavatus. Mediterranean.
corallinoides, Poli. Mediterranean.
crassicostatus, Sowerby. Moluccas.
danicus, Chemnitz. Scotland.
gibbus, Linn. Senegal.
layardi, Rve. Ceylon.
lemniscatus, Rve. Mauritius.
magellanicus, Lam. Massachusetts.
senatorius, Gmel. Zanzibar.
serratus, Sby. Mauritius.
splendidus, Sby. Torres Strait.
squamosus, Gmel. Moluccas.
subnodosus, Sby. Galapagos Ids.
tranquebaricus, Gmel. Tranquebar.
ventricosus, Sby. Lower California.
zelandiæ, Gray. New Zealand.
Vola dentata, Sby. California.
fumata, Rve. Australia.
Amussium balloti, Bernhardt. New Caledonia.
japonicum, Gmel. Japan.
Ostrea borealis, Lam. Massachusetts.

RADIATA.

- 8150 *Ophiocoma æthiops*, Lutken; in alcohol. Panama.
- 8151 *Ophionereis annulata*, Lyman; in alcohol. Samoan Ids.
- 8152 *Ophiomastrix annulosa*, M. & T. Pelew Ids.
- 8153 *Astropecten bispinosus*, M. & T. Australia.
- 8154 *Archaster agassizii*, Verr.; in alcohol. Martha's Vineyard.
- 8155 *Asterias ochracea*, Brand. California.
- 8156 *Heliaster kuingii*, Xanthus. Chili.
- 8157 *Acanthaster* sp. Samoan Ids.
- 8158 *Stichaster aurantiacus*, M. Chili.
- 8159 *Culcita grex*.; in formaldehyde.
- 8160 *Anthenea granulifera*, Gray. Australia.
- 8161 *Oreaster turritus*, M. & T. Pelew Ids.
- 8162 *Nidorella armata*, Gray. Panama.
- 8163 *Linckia lævigata*, Lam. Australia.
- 8164 *Asterina australis*, M. & T. Australia.
- 8165 *Asterina calcar*, Lam. Tasmania.
- 8166 *Dorocidaris papillata*, Ag. Bay of Naples.
- 8167 *Goniocidaris tubaria*, Lutk. S. Australia.
- 8168 *Phyllacanthus annulifera*, Ag. Australia.
- 8169 *Stephanocidaris bispinosa*, Ag. Philippines.
- 8170 *Diadema mexicanum*, A. Ag. Mexico.
- 8171 *Arbacia spatuligera*, A. Ag. Peru.
- 8172 *Salmacis alexandri*, Bell. Australia.
- 8173 *Amblypneustes ovum*, Lam. Australia.
- 8174 *Strongylocentrotus erythrogrammus*, Ag. Australia.
- 8175 *Strongylocentrotus tuberculatus*, Lam. Lord Howe Id.
- 8176 *Euechinus chloroticus*, Verr. New Zealand.
- 6792 *Echinus miliaris*, Australia.
- 6793 *Echinus* sp. Australia.
- 8177 *Hipponoe depressa*, Ag. Lower California.
- 8178 *Clypeaster speciosus*. California.
- 8179 *Laganum bonani*, Kl. Tasmania.
- 8180 *Echmarachnius parma*, Lam. Maine.
- 8181 *Arachnoides placenta*, Ag. Port Mackay.
- 8182 *Echinocardium australe*, Norman; in alcohol. Shetland.
- 8183 *Metalia pectoralis*, Ag. Bahamas.
- 8184 *Lovenia cordiformis*, Lutk. California.

LIST OF RECENT CORALS.

[In the Museum before the year 1899.]

It has seemed best to give a complete list of the corals in the Museum, and from time to time, in these Annual Reports, it is hoped that more or less complete lists of the contents of the collections may be given.

- 8825 *Euphyllia fimbriata*, E. & H. Micronesia.
- 8826 *plicata*, E. & H. Micronesia.
- 8827 *turgida*, Dana. Torres Straits.
- 8828 sp. Samoa.
- 8829 *Mussa multilobata*, Dana. Micronesia.
- 8830 *sinensis*, E. & H. Torres Straits.
- 8831 *tenuidentata*, E. & H. Torres Straits.
- 8832 *Trachyphyllia amarantum*, E. & H. Micronesia.
- 8833 *Tridacophyllia laciniata*.
- 8834 *lactuca*, Dana. Micronesia.
- 8835 *Dichocœnia* sp. Bahamas.
- 8836 ? Torres Straits.
- 8837 ? Torres Straits.
- 8838 *Aphrastræa deformis*, E. & H. Torres Straits.
- 8839 *Cyphastræa chalcidium*, Forskal. do.
- 8840 *Goniastræa eximia*, E. & H. do.
- 8841 *Prionastræa robusta*, do. do.
- 8842 sp. Torres Straits.
- 8843 sp. do.
- 8844 sp. do.
- 8845 sp. do.
- 8846 *Rhodaræa gracilis*, E. & H. Torres Straits.
- 8847 *Cœloria arabica*, Klz. Torres Straits.
- 8848 *Diploria cerebriiformis*, E. & H. Bahamas.
- 8930 *cerebriiformis*, do. do.
- 2705 *Leptoria tenuis*, do.
- 8849 *Merulina ampliata*, Lam. Micronesia.
- 8850 *ampliata*, Lam. Torres Straits.
- 8851 *regalis*, Dana. Fiji.
- 8852 *regalis*, Dana. Fiji.

- 8853 *Fungia diversidens*, E. & H. Fiji.
- 8854 *patella*, do. do.
- 8855 *patella*, do. do.
- 8856 *patella*, do. do.
- 8857 *patella*, do. do. [var.]
- 8858 *repanda*, Dana. Fiji.
- 8859 *repanda*, Dana. Fiji.
- 8860 *Pleuractis scutaria*, Verrill. Fiji.
- 8861 *scutaria*, Verrill. Fiji.
- 8862 *scutaria*, Verrill. Fiji.
- 8863 *Dendrogyra cylindrica*, Ehr. Bahamas.
- 8864 *cylindrica*, Ehr. Bahamas.
- 8865 *Ctenactis* sp. Fiji.
- 8866 sp. Fiji.
- 8867 sp. Fiji.
- 7630 sp. Gilbert Ids.
- 7631 sp. Gilbert Ids.
- 8868 *Herpetolitha limax*, Esch. Torres Straits.
- 2711 *crassa*, Dana. Fiji.
- 2712 *crassa*, Dana. Fiji.
- 8869 *Cryptabacia talpina*, E. & H. Torres Straits.
- 8870 *Halomitra clypeus*, Verrill. Samoa.
- 8871 *clypeus*, Verrill. Samoa.
- 2713 *clypeus*, Verrill. Micronesia.
- 8872 *Lithactinia pileiformis*, E. & H. Fiji.
- 8873 *Pavonia divaricata*, Dana. Samoa.
- 8874 *divaricata*, Dana. Samoa.
- 8875 *decussata*, Dana. Samoa. (2 specimens.)
- 8876 *decussata*, Dana. Samoa.
- 2727 *decussata*, Dana. Micronesia.
- 8877 sp. Micronesia.
- 8878 *Podabacia crustacea*, E. & H. Micronesia.
- 8879 *Hydnophora demidoffi*, Fischer. Torres Straits.
- 8880 *rigida*, Dana. Micronesia.
- 8881 *Pachyseris fluctuosa*, Verrill. Micronesia.
- 2733 *Dendrophyllia nigrescens*, Dana. Fiji.
- 2734 *nigrescens*, Dana. Gilbert Ids.
- 8882 *Galaxea bougainvillei*, Blain. Torres Straits.
- 8883 *Turbinaria frondens*, Verrill. Torres Straits.
- 8884 *peltata*, E. & H. Torres Straits.

- 8885 *Turbinaria peltata*, E. & H.
8886 *Astræopora echinata*, Verrill. Torres Straits.
8887 *Madrepora abrotanoides*, Lam. Fiji.
8888 *abrotanoides*, Lam.
8889 *abrotanoides*, Lam.
8890 *alliomorpha*, Brook. Fiji.
8891 *alliomorpha*, Brook. Fiji.
8892 *calamaria*, Brook. Fiji.
8893 *cervicornis*, Lam. Micronesia.
8894 *concinna*, Brook. Fiji.
8895 *concinna*, Brook. Fiji.
8896 *conferta*, Quelch. Fiji.
8897 *conferta*, Quelch. Fiji.
8898 *cymbicyathus*, Brook. Fiji.
8899 *cymbicyathus*, Brook. Fiji.
2703 *cytherea*, Dana. Tahiti.
8900 *dilatata*, Brook. Fiji.
2716 *echinata*, Dana. Samoa.
8901 *gravida*, Dana. Fiji.
8902 *leptocyathus*, Brook. Samoa.
8903 *millipora*, Ehr. Fiji.
8904 *nobilis*, Dana. Micronesia.
8905 *pacifica*, Brook. Fiji.
8906 *pacifica*, Brook. Fiji.
8907 *palifera*, Lam. Torres Straits.
8908 *palifera*, Lam. Torres Straits.
8909 *pulchra* (var. *stricta*), Brook. Fiji. (3 specimens.
8910 *pulchra* (var. *stricta*), Brook.
2714 *reticulata*, Brook.
2700 *rosaria*, Dana. Fiji.
2701 *rosaria*, Dana. Fiji.
8911 *rosaria* (var. *dumosa*), Dana. Fiji.
8912 *studer*, Brook.
2702 *spicifera*, Dana. Fiji.
2715 *spicifera*, Dana. Samoa. (2 specimens.)
2717 *samoënsis*.
8913 *valenciennesi*, E. & H. Fiji.
8914 sp. Torres Straits.
2724 sp.
2726 sp.

- 8915 *Montipora scabricula*, Dana. Torres Straits.
- 8916 *Alveopora excelsa*, Verrill.
- 8917 *Seriatopora hystrix*, Dana. Fiji.
- 8918 *hystrix*, Dana. Fiji.
- 8919 *hystrix*, Dana. Fiji.
- 8920 *Stylophora danæ*, E. & H. Micronesia.
- 8921 *Pocillopora acuta*, Lam. Micronesia.
- 2708 *aspera* (var. *lata*) Verrill. Oahu, H. I.
- 2706 *cespitosa*, Dana. Hawaii.
- 2707 *cespitosa*, Dana. Oahu.
- 8922 *danæ*, Verrill. Fiji.
- 2709 *ligulata*, Oahu.
- 8923 *nobilis*, Verrill. Samoa.
- 2710 *nobilis*, Verrill. Oahu.
- 8924 *Heliopora cœrulea*, Dana. Torres Straits.
- 8925 *cœrulea* do. do.
- 8926 *Porites arenosa*, E. & H. do.
- 8927 *lutea*, do. do.
- 8148 *Stylaster* sp. Samoa. (?)
- 2735 *Disticopora coccinea*. Gilbert Ids.
- 8928 *Millepora platyphylla*, Dana. Tahiti.
- 8929 *platyphylla*, Dana. Samoa.
- 2729 *platyphylla*, Dana. Samoa.
- 2732 *ramosa*, Dana.
- 2718 *tortuosa*, Dana. Samoa.
- 2737 *Allopora sanguinea*. Micronesia.
- 2704 *Tubipora syringa*, Dana. Fiji.
- 2719 *syringa*, Dana. Fiji.
- 8147 *Rhipidogorgia flabellum*, Val. Bahamas.
- 8149 *Mellitea ochracea*, Lam. Tonga.

PALÆOZOIC CORALS.

- 8211 *Acervularia davidsoni*, E. & H. Hamilton. Iowa City.
- 8212 *davidsoni*, E. & H. Hamilton. Iowa City.
- 8213 *davidsoni*, E. & H. Devonian. Near Dubuque, Iowa.
- 8214 *Acrophyllum oneidaense*, Billings. Corniferous. Falls of the Ohio.
- 8215 *rugosum*, G. K. Greene. Corniferous. Falls of the Ohio.

- 8216 *Alveolites constans*, Davis. Corniferous. Falls of the Ohio.
 8217 *fibrosus*, Davis. Niagara. Louisville, Ky.
 8218 *goldfussi*, Billings. Hamilton. Cuylersville, N. Y.
 8219 *goldfussi*, Billings. Hamilton. Charlestown, Ind.
 8220 *minimus*, Davis. Corniferous. Falls of the Ohio.
 8221 *mordax*, Davis. Middle Devonian. Falls of the Ohio.
 8222 *niagarensis*, Nicholson. Niagara. Bear Grass Creek, Ky.
 8223 *scandularis*, Davis. Hamilton. Charlestown, Ind.
 8224 *squamosus*, Billings. Corniferous. Falls of the Ohio.
 8225 *undosus*, S. A. Miller. Niagara. Louisville, Ky.
 8226 *Amplexus coralloides*, Sowerby. Warsaw. Lanesville, Ind.
 8227 *shumardi*, E. & H. Niagara. Louisville, Ky.
 8228 *Aulacophyllum convergens*, Hall. Hamilton. Charlestown, Ind.
 8229 *sulcatum*, d'Orbigny. Corniferous. Falls of the Ohio.
 8230 *Aulopora conferta*, Winchell. Hamilton. Near Charlestown, Ind.
 8231 *erecta*, Rominger. Hamilton. Charlestown, Ind.
 8232 *serpens*, Goldfuss. Hamilton. Charlestown, Ind.
 8233 *Blothrophyllum bucculentum*, G. K. Greene. Hamilton. Near Charlestown, Ind.
 8234 *cingulatum*, G. K. Greene. Corniferous. Falls of the Ohio.
 8235 *conigerum*, G. K. Greene. Hamilton. Charlestown, Ind.
 8236 *decortcatum*, Billings. Corniferous. Falls of the Ohio.
 8237 *flexuosum*, G. K. Greene. Hamilton. Near Charlestown, Ind.
 8238 *promissum*, Hall. Corniferous. Falls of the Ohio.
 8239 *sinuosum*, Hall. Corniferous. Falls of the Ohio.
 8240 *zaphrentiforme*, Davis. Hamilton. Charlestown, Ind.
 8261 *Calapœcia crebriformis*, Nicholson. Hudson River. Jefferson Co., Ind.
 8262 *Calceola tennesseensis*, Roemer. Niagara. Wayne Co., Tenn.
 8241 *Campophyllum torquium*, Owen. Carboniferous. Bird Creek, Ind.
 8263 *Cannapora junciformis*, Hall. Niagara. Rochester, N. Y.
 8242 *Chonophyllum magnificum*, Billings. Corniferous. Falls of the Ohio.
 8243 *nanum*, Davis. Hamilton. Charlestown, Ind.
 8244 *Chonostegites clappi*, E. & H. Corniferous. Le Roy, N. Y.

- 8245 *Cladopora alcicornis*, Davis. Hamilton. Charlestown, Ind.
- 8246 *aspera*, Rominger. Corniferous. Falls of the Ohio.
- 8247 *cryptodens*, Rominger. Corniferous. Falls of the Ohio.
- 8248 *expatiata*, Rominger. Corniferous. Falls of the Ohio.
- 8249 *fisheri*, Billings. Corniferous. Falls of the Ohio.
- 8250 *gurleyi*, G. K. Greene. Corniferous. Falls of the Ohio.
- 8251 *intermedia*, G. K. Greene. Corniferous. Falls of the Ohio.
- 8252 *labiosa*, Billings. Corniferous. Falls of the Ohio.
- 8253 *laqueata*, Rominger. Niagara. Louisville, Ky.
- 8254 *pinguis*, Rominger. Corniferous. Le Roy, N. Y.
- 8255 *reticulata*, Hall. Niagara. Illinois.
- 8256 *rimosa*, Rominger. Corniferous. Falls of the Ohio.
- 8257 *robusta*, Rominger. Corniferous. Falls of the Ohio.
- 8258 *roemeri*, Rominger. Corniferous. Falls of the Ohio.
- 8259 *turgida*, Rominger. Corniferous. Falls of the Ohio.
- 8260 *winchellana*, S. A. Miller. Corniferous. Falls of the Ohio.
- 8269 *Clisiophyllum conigerum*, Rominger. Corniferous. Falls of the Ohio.
- 8266 *Cœlophyllum pyriforme*, Hall. Corniferous. Falls of the Ohio.
- 8264 *Cœnites laminata*, Hall. Niagara. Louisville, Ky.
- 8265 *verticillata*, Winchell. Niagara. Louisville, Ky.
- 8267 *Columnaria alveolata*, Goldfuss. Hudson River. Madison, Ind.
- 8268 *Constellaria antheloidea*, Hall. Hudson River. Cincinnati, O.
- 8532 *antheloidea*, do. do. do.
- 8270 *Cyathaxonia profunda*, E. & H.
- 8271 *wisconsinensis*, Whitfield. Niagara. Chicago, Ill.
- 8272 *compressa*, G. K. Greene. Warsaw. Lanesville, Ind.
- 8273 *Cyathophyllum arctifossa*, Hall. Corniferous. Falls of the Ohio.
- 8274 *brevicorne*, Davis. Corniferous. Falls of the Ohio.
- 8275 *galerum*, Hall. Hamilton. Western New York.
- 8276 *geniculatum*, Rominger. Hamilton. Charlestown, Ind.
- 8277 *houghtoni*, do. do. Western New York.
- 8278 *juvenis*, Rominger. Corniferous. Charlestown, Ind.
- 8279 *radicula*, Rominger. Niagara. Louisville, Ky.
- 8280 *robustum*, Hall. Hamilton. Western New York.
- 8281 *rugosum*, Hall. Corniferous. Charlestown, Ind.
- 8282 *rugosum*, Hall. Corniferous. Jefferson Co., Ind.

- 8283 *Cyathophyllum tomatum*, Davis. Hamilton. Charlestown, Ind.
- 8284 *validum*, Hall. Corniferous. Falls of the Ohio.
- 8285 *zenkeri*, Billings. Hamilton. Charlestown, Ind.
- 8286 *Cystiphyllum americanum*, E. & H. Hamilton. Clark Co., Ind.
- 8287 *americanum*, E. & H. Hamilton. Western New York.
- 8288 *americanum*, do. do. do.
- 8289 *americanum*, do. do. do.
- 8290 *conifollis*, Hall. do. Charlestown, Ind.
- 8291 *crateriformis*, Hall. Corniferous. Falls of the Ohio.
- 8292 *crassatum*, G. K. Greene. Hamilton. Charlestown, Ind.
- 8293 *decurrens*, G. K. Greene. Corniferous. Falls of the Ohio.
- 8294 *gemmatum*, G. K. Greene. Hamilton. Near Charlestown, Ind.
- 8295 *grande*, Billings. Hamilton. Near Charlestown, Ind.
- 8296 *granilineatum*, Hall. Niagara. Louisville, Ky.
- 8297 *lacineatum*, G. K. Greene. Hamilton. Near Charlestown, Ind.
- 8298 *latiradius*, Hall. Hamilton. Charlestown, Ind.
- 8299 *nanum*, Hall. Corniferous. Falls of the Ohio.
- 8300 *niagarensis*, Hall. Niagara. Louisville, Ky.
- 8301 *osculum*, G. K. Greene. Hamilton. Charlestown, Ind.
- 8302 *ossiculum*, do. do. do.
- 8303 *plicatum*, Davis. Corniferous. Falls of the Ohio.
- 8304 *pustulatum*, Hall. Corniferous. Falls of the Ohio.
- 8305 *senecaëns*, Billings. Hamilton. Clark Co., Ind.
- 8306 *squamosum*, Nicholson. Corniferous. Falls of the Ohio.
- 8307 *varians*, Hall. Hamilton. Moscow, N. Y.
- 8308 *vesiculosum*, Goldfuss. Hamilton. Charlestown, Ind.
- 8533 *Cytelasma lanesvillense*, S. A. Miller. St. Louis. Lanesville, Ind.
- 8328 *Dendropora ornata*, Rominger. Hamilton. Charlestown, Ind.
- 8309 *Diphyphyllum adnatum*, Hall. Corniferous. Charlestown, Ind.
- 8310 *apertum*, Hall. Corniferous. Falls of the Ohio.
- 8311 *archiaci*, Billings. Corniferous. Falls of the Ohio.
- 8312 *cæspitosum*, Hall. Niagara. Bridgeport, Ill.
- 8313 *coagulatum*, Davis. Corniferous. Falls of the Ohio.
- 8314 *colletti*, G. K. Greene. Corniferous. Falls of the Ohio.

- 8315 *Diphyphyllum cylindraceum*, Hall. Corniferous. Charlestown, Ind.
- 8316 *gigas*, Rominger. Corniferous. Michigan(?).
- 8317 *laxum*, G. K. Greene. Hamilton. Near Charlestown, Ind.
- 8319 *multicaule*, Hall. Niagara. Monticello, Jones Co., Iowa.
- 8320 *panicum*, Winchell. Corniferous. Jefferson Co., Ind.
- 8321 *prolatum*, G. K. Greene. Hamilton. Near Charlestown, Ind.
- 8322 *rugosum*, E. & H. Niagara. Workhouse Quarry, Louisville, Ky.
- 8323 *simcoense*, Billings. Corniferous. Le Roy, N. Y.
- 8324 *stramineum*, Billings. Corniferous. Le Roy, N. Y.
- 8325 *unicum*, G. K. Greene. Hamilton. Charlestown, Ind.
- 8326 *verneuillianus*, E. & H. Corniferous. Clark Co., Ind.
- 8327 *wadsworthi*, G. K. Greene. Hamilton. Charlestown, Ind.
- 8329 *Duncanella borealis*, Nicholson. Niagara. Waldron, Ind.
- 8330 *Favistella stellata*, Hall. Hudson River. Indiana.
- 8534 *stellata*, do. do. Jefferson Co., Ind.
- 8331 *Favosites amplissimus*, Davis. Corniferous. Falls of the Ohio.
- 8332 *argus*, Hall. Hamilton. Pavilion, N. Y.
- 8333 *arbuscula*, Hall. Hamilton. Pavilion, N. Y.
- 8334 *canadensis*, Billings. Corniferous. Le Roy, N. Y.
- 8335 *cariosus*, Davis. Corniferous. Falls of the Ohio.
- 8336 *clausus*, Rominger. Hamilton. Charlestown, Ind.
- 8535 *clausus*, do. do. do.
- 8337^a *clelandi*, Davis. Corniferous. Falls of the Ohio.
- 8338 *constrictus*, Hall. Niagara. Rochester, N. Y.
- 8339 *convexus*, Davis. Corniferous. Falls of the Ohio.
- 8340 *cymosus*, Davis. Corniferous. Falls of the Ohio.
- 8341^a *digitatus*, Rominger. Corniferous. Le Roy, N. Y.
- 8342 *dumosus*, Winchell. Corniferous. Falls of the Ohio.
- 8343 *emmonsii*, Rominger. Hamilton. Iowa City.
- 8536 *emmonsii*, Rominger. Corniferous. Falls of the Ohio.
- 8344 *emmonsii*, Rominger. Corniferous. Clark Co., Ind.
- 8345 *epidermatus*, Rominger. Corniferous. Charlestown, Ind.
- 8537 *epidermatus*, Rominger. Corniferous. Lime Rock, N. Y.
- 8346 *epidermatus* (var. *corticiosa*), Hall. Corniferous. Le Roy, N. Y.
- 8347 *eximius*, Davis. Hamilton. Crab Orchard, Ky.
- 8348 *explanatus*, Hall. Hamilton. Western New York.

- 8349 *Favosites explanatus*, Hall. Hamilton. E. Bethany, N. Y.
 8350 *favosus*, Goldfuss. Niagara. Indiana.
 8351 *forbesi* (var. *occidentalis*), Hall. Niagara. Warren Co., Ohio.
 8352 *fustiformis*, Davis. Corniferous. Falls of the Ohio.
 8253 *globosus*, G. K. Greene. Hamilton. Charlestown, Ind.
 8254 *hamiltoniæ*, Hall. Hamilton. Charlestown, Ind.
 8355 *hemisphericus*, Y. & S. Corniferous. Louisville, Ky.
 8356 *hemisphericus* (var. *distorta*), Y. & S. Corniferous. Ind.
 8357 *hemisphericus* (var. *recta*, Hall), Y. & S. Corniferous. Indiana(?).
 8358 *hemisphericus* (var. *turbinatus*, Billings), Y. & S. Corniferous. Charlestown, Ind.
 8359 *hispidus*, Rominger. Niagara. Hawthorne, Ill.
 8360 *limitaris*, Rominger. Corniferous. Falls of the Ohio.
 8361 *maximus*, Troost. Corniferous. Falls of the Ohio.
 8362 *mundus* (var. *placentoides*), Davis. Devonian. Falls of the Ohio.
 8363 *niagarensis*, Hall. Niagara. Indiana(?).
 8364 *nitellus*, Winchell. Hamilton. Charlestown, Ind.
 8365 *occidens*, Winchell. Niagara. Hawthorne, Ill.
 8366 *pirum*, Davis. Corniferous. Falls of the Ohio.
 8367 *placenta*, Rominger. Corniferous. York, Livingston Co., N. Y.
 8368 *radiatus*, Rominger. Hamilton. Charlestown, Ind.
 8369 *radiciformis*, Rominger. Corniferous. Charlestown, Ind.
 8370 *spiculatus*, Davis. Corniferous. Falls of the Ohio.
 8371 *spinigerus*, Hall. Niagara. Waldron, Ind.
 8372 *tuberosus*, Rominger. Corniferous. Indiana(?).
 8373 *troosti*, E. & H. Corniferous. Falls of the Ohio.
 8374 *venustus*, Hall. Niagara. Wayne Co., Tenn.
 8375 *venustus*, do. do. Rochester, N. Y.
 8376 *winchelli*, Rominger. Devonian. Michigan.
 8377 *winchelli*, Rominger. Corniferous. Indiana.
 8378 *Fistulipora acervulosa*, Rominger. Hamilton. Watson, Ind.
 8379 *minuta*, do. do. do.
 8380 *unilinea*, Hall. Hamilton. York, N. Y.
 8381 sp. Cisco. Graham, Texas.
 8382 *Hadrophyllum d'orbigny*, E. & H. Upper Devonian. Charlestown, Ind.

- 8383 *Halysites catenulatus*, Linnæus. Niagara. Indiana(?).
- 8384 *Heliolites interstinctus*, Linnæus. Niagara. Louisville, Ky.
- 8385 *interstinctus*, Linnæus. Niagara. Louisville, Ky.
- 8386 *macrostylus*, Hall. Niagara. Illinois.
- 8387 *megastoma*, McCoy. Niagara. Louisville, Ky.
- 8388 *pyriformis*, Guettard. Niagara. Louisville, Ky.
- 8389 *subtubulatus*, McCoy. Niagara. Louisville, Ky.
- 8390 *Heliophyllum acuminatum*, Hall. Corniferous. Charlestown, Ind.
- 8391 *annulatum*, Hall. Corniferous. Charlestown, Ind.
- 8538 *annulatum*, do. do. do.
- 8392 *arachne*, Hall. Hamilton. Western New York.
- 8393 *beecheri*, G. K. Greene. Hamilton. Near Charlestown, Ind.
- 8394 *bordeni*, G. K. Greene. Corniferous. Charlestown, Ind.
- 8395 *canadense*, Billings. Corniferous.
- 8396 *confluens*, Hall. Hamilton. Western New York.
- 8397 *corniculum*, Lesueur. Corniferous. Falls of the Ohio.
- 8398 *degener*, Hall. Hamilton. Charlestown, Ind.
- 8399 *denticulatum*, Hall. Corniferous. Falls of the Ohio.
- 8400 *eriense*, Billings. Corniferous. Falls of the Ohio.
- 8401 *exiguum*, Billings. Corniferous. Louisville, Ky.
- 8402 *fecundum*, Hall. Corniferous. Falls of the Ohio.
- 8403 *gemmatum*, do. do. do.
- 8404 *geniculatum*, Rominger. Hamilton. Charlestown.
- 8405 *gurleyi*, G. K. Greene. do. Near Charlestown, Ind.
- 8406 *halli*, E. & H. do. Genesee Co., N. Y.
- 8407 *halli*, do. do. Clark Co., N. Y.
- 8408 *halli*, do. do. Moscow, N. Y.
- 8409 *halli*, do. (var. *reflexum*, Hall). Hamilton. East Bethany, N. Y.
- 8410 *invaginatum*, Hall. Corniferous. Falls of the Ohio.
- 8411 *irregulare*, Hall. Hamilton. Western New York.
- 8412 *jacksoni*, G. K. Greene. Hamilton. Charlestown, Ind.
- 8413 *juvensis*, Rominger. Hamilton. Charlestown, Ind.
- 8414 *laticrescens*, Hall. Corniferous. Charlestown, Ind.
- 8415 *multigemmatum*, Davis. Corniferous. Falls of the Ohio.
- 8416 *nanum*, G. K. Greene. Hamilton. Charlestown, Ind.
- 8417 *nettlerothi*, Hall. Corniferous. Falls of the Ohio.

- 8418 *Heliophyllum obconicum*, Hall. Hamilton. W. New York.
 8419 *obesum*, G. K. Greene. Hamilton. Charlestown, Ind.
 8420 *osculatum*, G. K. Greene. Hamilton. Charlestown, Ind.
 8421 *pocillatum*, Hall. Corniferous. Falls of the Ohio.
 8422 *proliferum*, Hall. Hamilton. Western New York.
 8423 *scyphulus*, do. do. Charlestown, Ind.
 8424 *scyphus*, Rominger. do. do.
 8425 *tenuimurale*, Hall. Corniferous. Falls of the Ohio.
 8426 *tumidulum*, G. K. Greene. Hamilton. Charlestown, Ind.
 8427 *turgidum*, do. do. do.
 8428 *Houghtonia huronica*, Rominger. Hudson River. Marion Co., Ky.
 8429 *Lithostrotion canadense*, Castlenau. Carboniferous. St. Louis.
 8430 *proliferum*, Hall. Subcarboniferous. Colesburg, Ky.
 8431 *Lophophyllum proliferum*, McChesney. Carboniferous. Graham, Texas.
 8432 *Michelinia clappi*, E. & H. Corniferous. Falls of the Ohio.
 8433 *convexa*, d'Orbigny. Corniferous. Indiana(?).
 8434 *dividua*, Hall. Hamilton. East Bethany, N. Y.
 8435 *dividua*, Hall. Upper Devonian. Crab Orchard, Ky.
 8436 *favositoidea*, Billings. Corniferous. Falls of the Ohio.
 8539 *favositoidea*, Billings. Corniferous. Ontario, Canada.
 8437 *insignis*, Rominger. Hamilton. Charlestown, Ind.
 8438 *insignis*, do. do. Sellersburg, Ind.
 8439 *insignis*, do. do. Falls of the Ohio.
 8440 *maxima*, Troost. Corniferous.
 8441 *maxima*, Troost. Corniferous. Louisville, Ky.
 8442 *stylopoda*, Eaton. Hamilton. Pavilion, N. Y.
 8443 *Monticulipora dalii*, E. & H. Hudson River. Richmond, Ind.
 8444 *delicatula*, Nicholson. do. Warren Co., O.
 8445 *frondosa*, d'Orbigny. Trenton. Decorah, Iowa.
 8446 *lycoperdon*, Say. Trenton.
 8447 *mammulata*, d'Orbigny. Hudson River. Cincinnati, O.
 8448 *mammulata*, d'Orbigny. do. Madison, Ind.
 8449 *meeki*, James. Hudson River. Warren Co., O.
 8450 *ramosa*, d'Orbigny. do. Jefferson Co., Ind.
 8451 *rugosa*, Hall. Trenton. Tyrone, Ky.
 8452 *ulrichi*, Nicholson. Hudson River. Covington, Ky.
 8453 *varians*, James. Hudson River. Lebanon, O.

- 8454 *Omphyma stokesi*, E. & H. Niagara. Louisville, Ky.
- 8455 *stokesi*, E. & H. Niagara. Bridgeport, Ill.
- 8456 *verrucosa*, Rafinesque. Niagara. Louisville, Ky.
- 8457 *verrucosa*, Rafinesque. Niagara. Louisville, Ky.
- 8458 *Pachyphyllum woodmani*, White. Chemung. Iowa.
- 8459 *Pachypora fischeri*, Billings. Corniferous. Falls of the Ohio.
- 8460 *Phillipsastræa gigas*, Owen. Upper Devonian. Crab Orchard, Ky.
- 8461 *verneuili*, E. & H. Corniferous. Ontario, Canada.
- 8462 *Plasmopora elegans*, Hall. Niagara. Louisville, Ky.
- 8463 *foliis*, E. & H. Niagara. Louisville, Ky.
- 8464 *foliis*, do. do Hillsboro, O.
- 8465 *Ptychophyllum expansum*, E. & H. Corniferous. Falls of the Ohio.
- 8466 *ipomœa*, Davis. Niagara. Louisville, Ky.
- 8467 *knappi*, Hall. Hamilton. Crab Orchard, Ky.
- 8468 *versiforme*, Hall. Corniferous. Falls of the Ohio.
- 8469 *Romingeria cornuta*, Billings. Hamilton. Charlestown, Ind.
- 8470 *dispensa*, Davis. Corniferous. Falls of the Ohio.
- 8471 *fasciculata*, Davis. Hamilton. Charlestown, Ind.
- 8472 *Streptelasma corniculum*, Hall. Hudson R. Richmond, Ind.
- 8473 *rectum*, Hall. Hamilton. Western New York.
- 8474 *Striatopora alba*, Davis. Corniferous. Falls of the Ohio.
- 8475 *cavernosa*, Rominger. Corniferous. Le Roy, N. Y.
- 8476 *limbata*, Eaton. Hamilton. York, N. Y.
- 8477 *Strombodes pentagonus*, Goldfuss. Niagara. Louisville, Ky.
- 8478 *separatus*, Ulrich. Niagara. Louisville, Ky.
- 8479 *striatus*, d'Orbigny. Niagara. Louisville, Ky.
- 8480 *unicus*, Davis. Niagara. Louisville, Ky.
- 8481 *Syringopora annulata*, Rominger. Niagara. Michigan(?).
- 8482 *hisingeri*, Billings. Corniferous. Le Roy, N. Y.
- 8483 *maclurii*, Billings. Corniferous. Falls of the Ohio.
- 8484 *multattenuata*, McChesney. St. Louis. Harrison Co., Ind.
- 8485 *nobilis*, Billings. Corniferous. Falls of the Ohio.
- 8486 *perelegans*, Billings. Corniferous. Le Roy, N. Y.
- 8487 *tabulata*, Billings. Corniferous. Falls of the Ohio.
- 8337^b *tubiporoides*, Y. & S. Corniferous. Falls of the Ohio.
- 8488 *Thecia major*, Rominger. Niagara. Louisville, Ky.
- 8489 *minor*, Rominger. Niagara. Louisville, Ky.

- 8490 *Thecia ramosa*, Rominger. Corniferous. Falls of the Ohio.
 8491 *swinderniana*, Goldfuss. Niagara. Louisville, Ky.
 8492 *Thecostegites hemisphericus*, Roemer. Niagara. Wayne Co., Tenn.
 8493 *Trachypora elegantula*, Billings. Hamilton. Clark Co., Ind.
 8494 *Zaphrentis acuticornis*, G. K. Greene. Hamilton. Charlestown, Ind.
 8495 *amplius*, G. K. Greene. Hamilton. Charlestown, Ind.
 8496 *calcariformis*, Hall. St. Louis. Lanesville, Ind.
 8497 *campanulatus*, G. K. Greene.
 8498 *centralis*, E. & H. Kaskaskia. Hardin Co., Ky.
 8499 *chesterensis*, Worthen. do. do.
 8500 *comis*, G. K. Greene. Hamilton. Charlestown, Ind.
 8501 *concava*, Hall. Corniferous. Charlestown, Ind.
 8502 *cornalba*, Davis. Hamilton. Charlestown, Ind.
 8341^b *cornicula*, E. & H. Corniferous. Le Roy, N. Y.
 8503 *dalei*, do. Keokuk. Edwardsville, Ind.
 8504 *davisana*, S. A. Miller. Corniferous. Falls of the Ohio.
 8505 *deformis*, Hall. Hamilton. Charlestown, Ind.
 8506 *duplicata*, do. Corniferous. Falls of the Ohio.
 8507 *elegans*, do. do. do.
 8508 *frequentata*, do. do. do.
 8509 *gallicular*, Davis, Hamilton. Charlestown, Ind.
 8510 *gigantea*, Lesueur. Corniferous. Falls of the Ohio.
 8511 *humilis*, G. K. Greene. Hamilton. Charlestown, Ind.
 8512 *insolens*, do. do. do.
 8513 *ischypus*, do. do. do.
 8514 *lanceolata*, Worthen. St. Louis. Lanesville, Ind.
 8515 *limatus*, G. K. Greene. Hamilton. Charlestown, Ind.
 8516 *nitida*, Hall. Corniferous. Falls of the Ohio.
 8517 *obliquatus*, G. K. Greene. Corniferous. Falls of the Ohio.
 8518 *ovalis*, Hall. Corniferous. Falls of the Ohio.
 8519 *profunda*, Hall. Corniferous. Falls of the Ohio.
 8520 *prolifera*, Billings. Corniferous. Falls of the Ohio.
 8521 *racienensis*, Whitfield. Niagara. Bridgeport, Ill.
 8522 *roemeri*, E. & H. Lower Helderburg. "The Tyke", Catskill.
 8523 *simplex*, Hall. Hamilton. Western New York.
 8524 *spinulosa*, E. & H. Kaskaskia. Hardin Co., Ky.
 8525 *spissa*, Hall. Corniferous. Falls of the Ohio.

- 8526 terebrata, Hall. Corniferous. Falls of the Ohio.
- 8527 torta, Hall. Corniferous. Falls of the Ohio.
- 8528 undata, Hall. Corniferous. Le Roy, N. Y.
- 8529 ungula, Rominger. Corniferous. Louisville, Ky.
- 8530 varians, G. K. Greene. Hamilton. Charlestown.
- 8531 yandelli, Hall. Corniferous. Falls of the Ohio.

BOTANICAL AND GEOLOGICAL SPECIMENS.

- 6788 Opals, from New South Wales.
- 6794 Awa root, from Samoa. Given by Dr. Kramer.
- 8545 Nine specimens of lava, from Kilauea. Given by Mr. F. Waldron.
- 8554 Lava mould of tree stem. Given by Mr. F. Waldron.
- 8555 Volcanic bomb. Given by Mr. F. Waldron.
- 8556 Rope lava crust, from Kilauea. Given by Mr. F. Waldron.
- 8557 Lava pushes, from Kilauea.
- 8558 Edge of lava stream.
- 8559 Lava push, from Kilauea.
- 8560 Inner crust of lava from near sulphur cracks, Kilauea.
- 8561 Inner roof of cave, Kilauea.
- 8562 Lava, from Kilauea.
- 8563 Fresh aa.
- 8565 Lava, from Kilauea.
- 8570 Block of Naio (*Myoporum sandwicense*). Given by Mrs. F. Waldron.

Many specimens of plants gathered near Kilauea have not yet been mounted in the Herbarium.

